

Minutes of 22nd PERC (Project Evaluation & Review Committee) meeting held under the Chairmanship of Shri Upendra C. Joshi, Joint Secretary, Ministry of Mines during 03rd – 05th Aug 2022 through VC. The list of participants is enclosed in Annexure-A.

1. The project proposals under the Science & Technology Programme Scheme of Ministry of Mines were invited online on SATYABHAMA portal (research.mines.gov.in). The last date of receipt of proposals was 13th May 2022.

2. A total number of 319 project proposals were received online on the portal. A two-stage review process was adopted to evaluate the proposals for recommendation to Standing Scientific Advisory Group (SSAG). The first stage comprised of preliminary screening of the proposals done by a team of experts constituted by Ministry of Mines. Based on the guidelines as adopted in 14thPERC, the experts conducted pre-screening of the proposals. After screening, 82 proposals covering five areas, namely (i) Geosciences and Exploration (ii) Mining (iii) Mineral Processing & recovery from waste (iv) Metal Extraction (Metallurgical processes) and (v) Alloys, specialty materials and product; were short listed for further review in the second stage. Three virtual meeting rooms were arranged by JNARDDC, Nagpur for (a) Mining – (i & ii) (b) Mineral Processing (iii) and (c) Metallurgy (iv & v). All the members and PIs attended the meeting through Video Conferencing mode. In addition to the new proposals the committee re-considered 9 proposals which were recommended for resubmission by the last PERC / SSAG with certain changes. Thus (82+9) = 91 project proposals were presented by the respective Principal Investigators (PIs) and evaluated by the committee during the VC meeting held on 03-05 Aug 2022. Furthermore, 4 completed and 35 ongoing projects were also reviewed by the committee. As per the terms of reference of PERC, the concerned members recused themselves, to avoid conflict of interest, from the proceedings from that part of the meeting when project(s) related to their institute(s) was/were under consideration.

3. The following criteria were given to all the experts for detailed evaluation.

- (i) Is the problem well defined?
- (ii) Does the proposal adequately cover prior work both in the institution and elsewhere \ Is it similar to any earlier work already sanctioned; has the PI done prior work to prove proof of concept before submitting the project or is the project in the early stage itself ?
- (iii) Does it address a critical gap in our country's needs and requirements?
- (iv) Is the methodology of work well laid out and doable?
- (v) Are the deliverables well defined?
- (vi) Is there a translational potential for application / user interface; Can it move to higher TRL?

- (vii) Does the PI and institution have adequate competence to do the proposed research?
- (viii) Is there collaboration with another Lab or institution or industry to enhance the quality and quantum and application potential?
- (ix) Budget: Is the budget correctly done; Is there deficiency or excess?
- (x) Time duration:
- (xi) Any other comments.

The 3 panels met together at the end and selected the projects for recommendation to the next level SSAG, or asked the PIs to revise and attempt a resubmission to the next PERC or not recommended at all. The details are given in the succeeding paragraphs.

Final recommendation

- (i) Recommended with or without changes to SSAG: **29 Project Proposals**
- (ii) To be revised and resubmitted in next PERC: **5 project Proposals**
- (iii) NOT recommended: **57 Project Proposals**
- (iv) Review of report of completed **(4)** and ongoing projects **(35)**

4. Based on the detailed review and evaluation, the following new project proposals are being recommended to SSAG. ***The details of recommended projects and specific recommendations are given hereunder:***

RECOMMENDED- 29 nos.

1	
Project No.	SNTMOM/684/2022
Project Title	Potentiometric low-cost sensing of rare earth and other heavy metals with high specificity in prospecting for minerals
Institution	Indian Institute of Technology Delhi
Principal Investigator	Madhusudan Singh (7503608075, msingh@ee.iitd.ac.in)
Project Cost & Duration	Rs. 67,80,450.00 3years
Objectives of the project	A. Develop non-specific rare earth atom / heavy metal sensing devices, based on our existing work on Cu and Cd sensing ISEs and ISFETs, for rapid in-field testing of minerals. B. Develop a library of metal-organic framework (MOF) based functionalized with a range of chelating ligands for highly specific coordination of rare earth ions, and integration of these layers into one-time use sensors. C. Develop artificial intelligence (AI) / machine learning (ML) based models to use sensor data from non-specific sensors (a) to predict presence of specific rare earth ions in presence of confounding data. Training of models will employ sensors (b) along with currently standard analytical methods like ICP-MS/XPS/EDX, etc.

**REMARKS/SUGGESTION:
RECOMMENDED WITH MODIFICATIONS**

1. Project idea is good
2. Seed money of Rs. 10 Lakhs is recommended for a period of one year to establish validity for at least 4 rare earth elements.
3. PI should contact NFTDC to get the mixed RE solutions

2	
Project No.	<u>SNTMOM/700/2022</u>
Project Title	Estimation and Fingerprinting of Chromite, Ni, PGE Resources in Selected Geological tracts of Singhbhum (Sukinda) and Western Dharwar Craton (Nuggihalli chromite belt). Geosciences and Exploration
Institution	CSIR National Geophysical Research Institute
Principal Investigator	P V SUNDER RAJU (9490748152, pvsraju@ngri.res.in)
Project Cost & Duration	Rs. 15,12,000.00 1yrs
Objectives of the project	To collate the published Reports from GSI etc., available in public domain Integrated Geological, Geochemical and Geophysical studies for the delineation of Chromitite extensions in Nuggihalli Schist Belt and implications for Ni-Cu+-PGE mineralization. 2. Develop a database 3. Controls on platinum group element variation in mafic-ultramafic-magmatic systems 4. Prospectivity indicators for magmatic Ni-Cu sulfides. 5. Apply the Fingerprinting for chromite in virgin potential geological tracts

REMARKS/SUGGESTION:

RECOMMENDED

1. The project idea is good and presently targeting Chromium, Nickel and PGE of different chromite mines.
2. The process of estimation would be useful to evaluate the elements
3. Approach is innovative and would help the industries

3	
Project No.	<u>SNTMOM/718/2022</u>
Project Title	Development of supercapacitor devices for grid-level energy storage application based on natural mineral Chalcopyrite and bauxite residue. Mining (includes rock mechanics, design, equipments, energy, environment, safety)
Institution	Indian Institute of Technology Bhubaneswar
Principal	Saroj Kumar Nayak

Investigator	(9438290179, nayaks@iitbbs.ac.in)
Project Cost & Duration	Rs. 31,42,600.00 3yrs
Objectives of the project	We present a research proposal explaining the significant role of nanostructured CuFeS ₂ along with the waste, bauxite residue (red mud), in playing a major role towards electrochemical charge storage. ? The proposal highlights the importance, current progress and futuristic prospects of supercapacitor based on nanostructured materials based CuFeS ₂ and red mud. ? One of the core objectives of this proposal is to develop CuFeS ₂ and red mud-based supercapacitors which can provide long term and cost-effective solution in the field of electric energy storage. The surge in energy demand is inevitable considering the fact that the electronic industry and transportation sector are expanding rapidly to meet the public demand. ? The purpose of taking red mud is to introduce the novel concept of “waste to energy”. As the red mud contains maximum amount of Fe ₂ O ₃ , so after purification of red mud, Fe ₂ O ₃ can be used as electrode material of supercapacitor. ? Apart from the experimental development, first principles based theoretical investigations will be carried out for the understanding the atomic/electronic level mechanism of CuFeS ₂ based supercapacitor devices ? Synthesis, characterization, and performance evaluation of the supercapacitor devices.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is good and has novelty. 2. The PI should establish the proof of concept with the developed material. 3. Seed money of Rs. 20 lakh is recommended for a period of 1½ years. 4. Based on these findings the next phase of the project may be decided in developing prototype validation etc. 	

4	
Project No.	<u>SNTMOM/723/2022</u>
Project Title	Synthesis of precipitated silica from waste beach sand tailings and its value addition in glass making industries Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	SOCIETY RAMAN EDUCATION
Principal Investigator	SUNITA ROUSTRAY (7327847963, sroustray1@cvrce.edu.in)
Project Cost	Rs. 26,90,700.00

& Duration	2yrs
Objectives of the project	1. Value addition of waste beach sand tailings 2. To generate wealth from waste 3. To produce precipitated silica 4. Utilization of precipitated silica for industrial applications especially in glass making industries.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> The project idea is good. PI should focus on achieving purity of silica (+99%) for its utilization in glass and other industries. As beach sand tailing is associated and under the control of IREL, PI needs to submit a letter form IREL for providing samples for the research work. Project is recommended with a revised budget of 15 Lakhs for a duration of 1½ year. 	

5	
Project No.	<u>SNTMOM/726/2022</u>
Project Title	Development of low-cost heterogeneous catalyst using Red mud for Biodiesel Production. Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	PRACHIPRAVA PRADHAN (9438760367, prachi@jnarddc.gov.in)
Project Cost & Duration	Rs. 29,35,800.00 2yrs
Objectives of the project	(i) Conversion of red mud as low-cost heterogeneous catalyst for biodiesel synthesis from waste cooking oil in Oscillatory Baffle Reactor. (ii) To assess engine performance of biodiesel produced from transesterification of waste cooking oil using red mud as a catalyst and its blends with petro diesel.
REMARKS/SUGGESTION:	
RECOMMENDED	
<ol style="list-style-type: none"> Project proposal is good with application potential. Project targets to develop low-cost catalyst in biodiesel production The value of catalyst could be attractive based on the quantum of uses Based on outcome the scale up avenues could also be worked out 	

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6	
Project No.	SNTMOM/744/2022
Project Title	Dissolution of chalcopyrite and other sulphide ores using extractive deep eutectic solvents
Institution	K.C college, HSNC University, Mumbai (Hyderabad Sind National Collegiate Board)
Principal Investigator	Hemlata K. Bagla (9821420698, hemlata.bagla @kccollege.edu. in)
Project Cost & Duration	Rs. 50,00,000.00 3 years
Objectives of the project	1. Very limited water consumption 2. Reduced energy consumption 3. Process intensification 4. Reduced consumption of acids 5. Higher selectivity for leaching 6. Suitable for the treatment of low-grade ores, mine tailings, and industrial process residues 7. Useful for the treatment of urban waste 8. New separation processes with low generation of toxic gases and waste
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Idea is novel and aims for zero waste. 2. PI should approach NFTDC for facility utilization and project guidance specific to removal of copper from solutions obtained from recycled LiB. 3. Emphasis on cost-effective solvents. 4. Recommended for seed money of Rs. 10 Lakhs for 1 Year to perform prefeasibility studies with emphasis on Cu recovery from Li-Fe batteries and establish POC. 	

7	
Project No.	SNTMOM/745/2022
Project Title	Techno Economic survey of copper recycling industry in India Metal Extraction (Metallurgical processes)
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	KOLA IMMANUEL RAJU (9980574024, immanuelkola@jnarddc.gov.in)
Project Cost & Duration	Rs. 57,33,000.00 1 year
Objectives of the project	1. To establish techno-economic scenario of copper scrap recycling industry in the country. 2. To corroborate facilities, current and best practices for collection, processing and value addition in entire copper scrap recycling.
REMARKS/SUGGESTION: RECOMMENDED	
<ol style="list-style-type: none"> 1. Panel noted that JNARDDC has been nominated as MRA for undertaking the 	

<p>functions stipulated in National Non-Ferrous Metal Scrap Recycling Framework, 2020.</p> <ol style="list-style-type: none"> The proposed work of data collection of copper is crucial. PI should collaborate with International bodies like ICA, ICSZG.

8	
Project No.	SNTMOM/747/2022
Project Title	Recovery of Li, Ni, Mn and Co from spent Li-ion Battery using facile and ecofriendly recovery process Metal Extraction (Metallurgical processes)
Institution	Banaras Hindu University
Principal Investigator	Rajendra Kumar Singh (9451000681, rajendrasingh.bhu@gmail.com)
Project Cost & Duration	Rs. 28,46,655.00 3 Yrs
Objectives of the project	Electric vehicle (EV) battery market of India has targeted to achieve \$300 billion by 2030. The National Electric Mobility Mission (NEMM) Project 2020 of India has aimed to bring ~7 million EVs with clean energy aim of 175 GW by 2022. Owing to high cost associated with batteries (40–50 % of EV cost), the spent batteries without recycling can be turned into severe environmental hazard. Rapid expansion of LIB market has resulted significant battery waste. The recycling rate is only at sporadic level worldwide, while no significant project has started yet in our country. Most of these spent LIBs are ending up in landfills. Present project is aimed at developing spent LIB derived precious Li, Ni, Co and Mn metals for fabricating Li nickel manganese cobalt oxide (NMC) cathodes for LIBs for EVs and HEVs. Specific objectives are: To dismantle and discharge spent lithium ion batteries (LIBs) to recover Li and other costly metals Ni, Co and Mn using hydrometallurgical and leaching processes. To recover about 95% of Li, and about 90% of Ni, Co, Mn from spent LIBs using ecofriendly and energy efficient routes using ionic liquid (IL). To reuse the recovered metals Li, Ni, Co and Mn from spent LIBs for fabricating LIBs and test the performance of LIBs fabricated.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> Project idea is novel. Recommended with seed money of Rs. 10 lakhs for one year to do POC for demonstrating the selective binding of Li/Ni/Co/Mn in ionic liquids. PI should contact NFTDC for getting the solutions from recycled LiB from its pilot plant 	

9	
Project No.	SNTMOM/749/2022
Project Title	Processing of Bauxite Residue Dressing, Mineral Processing & Recovery from waste by Innovative Pyro-Hydrometallurgical Process for Exploring Value Added Bulk Waste Utilization Beneficiation, Ore

Institution	CSIR Institute of Minerals and Materials Technology)
Principal Investigator	Chinmaya Kumar Sarangi (8895198482, cksarangi@immt.res.in)
Project Cost & Duration	Rs. 91,31,390.00 2yrs
Objectives of the project	(1) Establishment of the process for extraction of alumina, iron and titania from Bauxite residue through an innovative process of gaseous reduction followed by hydrometallurgical routes. (2) Utilization of final residue generated after recovery of metal and material values from Bauxite residue. (3) Process parameters optimization for each unit operation involved in the extraction of metal and material values from Bauxite residue. (4) Scale-up testing of the flowsheet at 5-10 kg Bauxite residue processing scale for its validation. (5) Material balance and cost economics of the process. (6) Feasibility, way forward (pilot plant scope) and project report preparation.
REMARKS/SUGGESTION:	
RECOMMENDED	
<ol style="list-style-type: none"> 1. Project is good and process for recovery of iron, alumina and titania along with use of final residue from red mud presented and is well appreciated by all members 2. The process is innovative and different from various other processes targeted. 3. The recovery and efficiencies presented based on lab work is quite significant with likely viability. 4. PI should assess rare earth elements mix while working out on metals recoveries 	

10	
Project No.	<u>SNTMOM/752/2022</u>
Project Title	Studies on ilmenite mineral using synthesis gas generated from gasification of carbonaceous materials Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	CSIR Institute of Minerals and Materials Technology)
Principal Investigator	Rakesh Saini (09680842254, rakeshsaini@immt.res.in) CSIR Institute of Minerals and Materials Technology
Project Cost & Duration	Rs. 48,57,000.00 3yrs
Objectives of the project	Recovery of titanium and iron metal from ilmenite ore fines using synthesis (syn) gas, Hydrogen, and natural gas is gaining popularity due to the simultaneous availability of heat and reductant sources with

	<p>the utilization of biomass or coal. This novel process majorly utilizes ilmenite ore fines of less than 100-micron size. It applies reducing gases such as Hydrogen, syngas, methane etc., at high temperatures to recover valuable metals such as Ti and Fe from ilmenite ore fines. Compared to the conventional technologies, which are highly energy and resource-intensive, the ilmenite ore-reduction process using the reducing gas has environmental benefits and is considered a sustainable approach. In this process, biomass, coal, lignite, or petcoke supply high-temperature reducing gas by applying the gasification process. This process can eliminate the energy-intensive and complex steps and thus improves the overall energy consumption in a sustainable way. As per the literature, Ti and Fe metal production from ilmenite ore fines could be improved by 35% to 40% in terms of overall energy consumption if a technology independent of complex processes is developed. The reduction process will be carried out in a fluidized bed gasification reactor with a limited residence time of a few seconds. Here, the fluidized bed gasification reactor design and syn-gas composition are critical to the process performance; therefore, a software-based optimization and scale-up study will be carried out along with the lab-scale experimental work. The major objectives of the proposed project could be categorized as – (a)Studies on ilmenite to recover valuable titanium and titanium-based compounds for industrial applications using synthesis gas generated from gasification.(b)Development of a fluidized gasification reactor based ilmenite conversion process from the cost-effective carbonaceous materials.(c)Energy optimization of the aforementioned process by applying and developing the model.</p>
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is good but needs focussed objectives with differentiation from other similar work 2. Project recommended with a seed money of Rs. 15 Lakhs for 2 years to establish the proof of concept. PI may get the balance fund from his parent organization. 3. Association of industry (IREL) is essential in such type of work to access its potential. PI should submit consent letter of IREL. 	

11	
Project No.	SNTMOM/755/2022
Project Title	Graphitic Ore Derived Fluorographenes for Energy Storage Applications
Institution	University of Calicut
Principal Investigator	Renuka N. K. (9447647790, nkrenu@gmail.com)
Project Cost & Duration	Rs. 86,97,700.00 3 years

Objectives of the project	The specific objectives of the proposed project are: a) Value addition of graphene derived from locally mined graphite ore by converting it to fluorographene having multifaceted applications. b) Synthesis of fluorographene from the graphene-organic dye dispersion via displacing the noncovalently bound dyes on graphene with fluorine, using suitable alkali fluorides and optimization of fluorine and oxygen contents in fluorographenes by altering the reaction parameters like the reaction time, the concentration of fluorine source, etc. c) To prepare fluorographene-based aerogel, hydrogel, and mixed metal-oxide nanocomposites and evaluation of electrochemical characteristics in terms of voltage limit, specific capacitance, energy density, power density and lifetime using cyclic voltammetry (CV), galvanostatic charging/discharging (GCD), and electrochemical impedance spectra (EIS). d) Fabrication and testing of efficient, low-cost, easy-to-process fluorographene based supercapacitor devices.
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is novel. 2. The testing charges may be included in PI's institutional budget. 3. Total Budget revised to Rs. 40 lakhs for 2 years. 4. The emphasis should be on super capacitor device development using Fluorographenes materials developed in the project. 	

12	
Project No.	SNTMOM/760/2022
Project Title	Process for Recovering Zinc from Secondary Resources (Zinc Tailing and Jarosite) and Utilization of Process Wastes into Lightweight Building Materials Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	ANAS N S (7382105254, anas@jnarddc.gov.in)
Project Cost & Duration	Rs. 48,86,216.00 2yrs
Objectives of the project	The objectives of the proposal are as below: • Develop a sustainable process for utilizing secondary zinc resources. • Achieve selective recovery of available zinc (Zn) for mineral augmentation • Attain resource efficiency (to fulfil zero-waste concept) by utilizing leftover rejects as lightweight building materials
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is good 2. PI should first target on recovery efficiency of zinc mineral value based on characteristics of mineral phases in jarosite and zinc mine tailings 	

3. Seed money of Rs. 20 lakh is recommended for a period of 1½ year.
4. Based on these findings, the next phase of the project may be decided

13	
Project No.	SNTMOM/764/2022
Project Title	Designing lightweight and highly formable Mg-Li-Zn-Ca-RE based alloys using the CALPHAD method
Institution	Indian Institute of Technology Jodhpur
Principal Investigator	Jaiveer Singh (9022080900, jaiveer@iitj.ac.in)
Project Cost & Duration	Rs. 46,88,200.00 3 years
Objectives of the project	The major objectives of the proposed work are as follows: 1. Design of binary (Mg-Li/Zn/RE) and complex (Mg-Zn-Ca, Mg-Zn-RE, Mg-Zn-Ca-RE, Mg-Li-Zn-RE) Mg alloy systems by thermodynamic modeling based on the CALPHAD approach for getting optimized compositions. 2. Successful fabrication of the newly designed alloys using the induction melting furnace by controlling the cooling rates and the casting atmosphere. 3. Optimization of thermo-mechanical processing parameters for obtaining the weaker basal texture using the Gleeble thermo-mechanical simulator. 4. Detailed microstructural characterization (OM, SEM, EBSD, t-EBSD (TKD), and X-ray diffraction) and evaluation of room temperature mechanical properties to establish the microstructure-property relationships for the developed Mg alloys. 5. Experimental investigation of crystallographic texture and change in c/a ratio of h.c.p. unit cell in the developed Mg alloys will be performed to understand the active deformation mechanisms at room temperature. 6. Detail investigation of corrosion behavior for selected processing conditions of optimized alloys in various corrosive media will be carried out and a microstructure-corrosivity relationship will be established.
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is good. 2. Revised cost of Rs. 25 lakhs for 2 years is recommended. 3. PI should engage with NFTDC for assistance in melting and rolling facilities. 	

14	
Project No.	SNTMOM/783/2022
Project Title	Enhancement of Mechanical and Electrical properties of Iron (Fe) by incorporation of Graphene (Gr) for advance applications Alloys, Rare Earths, Specialty materials and product
Institution	Balaram Panda Trust
Principal Investigator	Priyambada Nayak (7873008101, dr.priyambada@gift.edu.in)

Project Cost & Duration	Rs. 24,41,800.00 3yrs
Objectives of the project	The present proposal is the enhancement of composites by following specially developed process. (i) The aimed to develop Iron based special composites with the incorporation of graphene, and workout the cost effectiveness vis-à-vis advanced properties for engineering applications. (ii) To improve the mechanical and electrical properties of the develop Iron-graphene metal matrix composite with improved properties. (iii) To work out the cost economics compared with the existing composites for different applications. (iv) Explore development of prototype and validation of the newly prepared composites in association with industry partner.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. The project idea is good. 2. PI should use normal iron instead of low-grade iron to develop the target material for its validation in phase-1 3. Prototype preparation could be taken up in next phase. 4. A seed money of Rs. 15 Lakh for a period of two years is recommended. 	

15	
Project No.	<u>SNTMOM/795/2022</u>
Project Title	Agglomeration of spent garnet for possible reuse as abrasives in water jet applications Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste (Duration: 2 Yrs, 0 Mth) Submitted
Institution	SSN TRUST
Principal Investigator	V.E.Annamalai (9840359093, annamalaive@ssn.edu.in)
Project Cost & Duration	Rs. 27,47,000.00 2yrs
Objectives of the project	i) The background: Garnet is an environmental friendly material with specific applications. Large quantities are used in waterjet application as abrasives. The usable size is around grit 80. After use, the material gets too fine and becomes unusable. At this stage it is a waste that needs to be handled only by landfilling. Objectives: The objective is to reconstruct the spent garnet into required bigger / usable size by material processing techniques. From larger agglomerates of spent garnet, required usable size can be generated by size reduction methods. This may enable reusing the material again, in waterjet applications.
REMARKS/SUGGESTION:	

RECOMMENDED WITH MODIFICATIONS

1. Project idea is good
2. The PI needs to establish the agglomeration process for its abrasive application in phase-1
3. A seed money of Rs 15 lakh for 1½ years is recommended for taking up the work and establishing commercial avenues for possible MSME.

16	
Project No.	SNTMOM/796/2022
Project Title	Techno-economic Survey of Lead recycling Industry Metal Extraction (Metallurgical processes)
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	V N S U VISWANATH AMMU (7798546794, viswanatha@jnarddc.gov.in)
Project Cost & Duration	Rs. 58,38,000.00 1 year
Objectives of the project	To establish a techno-economic scenario of lead scrap recycling industry in the country • To provide support in promoting sustainable recycling of lead and circular economy for lead recycling
REMARKS/SUGGESTION:	
RECOMMENDED	
<ol style="list-style-type: none"> 1. Panel noted that JNARDDC has been nominated as MRA for undertaking the functions stipulated in National Non-Ferrous Metal Scrap Recycling Framework, 2020. 2. The proposed work of data collection of lead is crucial. 3. PI should collaborate with International bodies. 	

17	
Project No.	SNTMOM/814/2022
Project Title	Setting up of pilot cum demonstration plant for recovery of alumina and value-added products from fly ash Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	KALI SANJAY (9338291970, ksanjay@immt.res.in)
Project Cost & Duration	Rs. 3,92,16,000.00 3yrs
Objectives of the project	• Validation of Proof of Concept, Generation of engineering data and preparation of Basic Engineering Package (BEP) for setting up of pilot plant (50 kg/day fly ash) at NALCO • Preparation of Detailed

	Engineering data sheet for bought out equipment and installation of pilot cum demonstration plant (50 kg/day fly ash) and commissioning at NALCO • Pilot plant campaigns including fine-tuning of process parameters for generating data and products • Product evaluation/testing/developing sub-processes for utilizing by-products including recovery of REEs in lab-scale • Technical Feasibility report with viability for processing of fly ash to extract alumina and other valuables.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. The project proposal is very good with elaborate proof of concept with global importance. 2. PI informed that two stages of work already carried out earlier on this project with NALCO support. PI has also submitted the 3rd stage of scale-up proposal to NALCO which is under review. Confirmation from NALCO is awaited. Parallely, they have submitted the current proposal for pilot plant to PERC with partial industry support. 3. The pilot plant will be set up in NALCO. 4. In view of its national significance, the proposal is recommended with 50% support by MoM and 50% funding by NALCO. 5. PI should intimate about the decision of NALCO before the SSAG meeting to avoid duplicate funding. 	

18	
Project No.	<u>SNTMOM/832/2022</u>
Project Title	Development of a sustainable material using chromite mine overburden and other industrial wastes for stowing or backfilling of underground mines in Sukinda Valley, Odisha Mining (includes rock mechanics, design, equipments, energy, environment, safety)
Institution	National Institute of Technology Rourkela)
Principal Investigator	Himanshu Bhushan Sahu (9437245625, hbsahu@nitrkl.ac.in)
Project Cost & Duration	Rs. 38,88,600.00 3yrs
Objectives of the project	The main objective of the research work is to develop a sustainable material using chromite mine overburden and other industrial wastes for stowing/backfilling of underground mines in Sukinda Valley, Odisha. Keeping the aforementioned problem in mind, the work has been planned with the following objectives: 1. Characterization of OB material collected from Sukinda valley 2. Determination of strength and water drainage characteristics for different size fractions of OB 3. Determination of strength and water drainage characteristics for

	different size fractions of OB-fly ash and/or tailing mixture 4. Study of leachates using chemical analysis 5. Numerical simulation for stability and material flow modeling. 6. Development of a suitable material based on the laboratory investigation and simulation results.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. The project is innovative. 2. Committee recommends a seed money of Rs.15 lakh for a period of 1½ year to undertake characterization of over burden from Sukinda chromite mines for the proposed work and exclude the simulation and modelling part at present in phase-1 3. Industry support from OMC and TATA were shown by PI with regards to providing required samples. 	

19	
Project No.	SNTMOM/834/2022
Project Title	SiAlON based Novel Composites for Rock Drilling-A plausible Alternative of Hard WC-Co composite
Institution	CSIR Central Glass and Ceramic Research Institute
Principal Investigator	Soupitak Pal (8777541388, soupitak@cgcri.res.in)
Project Cost & Duration	Rs. 48,04,674.00 3 Yrs
Objectives of the project	The broad objective of the proposed research is to design and develop potential candidate material for the replacement of the WC as a drilling tool material used in mining industries. However, in the milieu of the present proposal, the specific objectives are given below: 1) Processing of SiAlON and SiAlON-Co composite (less than 5 wt.% of Co)with microstructure tailoring to produce a tougher (KIC ~ 10 MPavm) and hard (hardness ~20 GPa) ceramics-metal composite. 2) Qualify the as-fabricated composite in terms of strength, hardness, and toughness as a replacement for WC-Co composite. 3) Characterization of tribological behavior of the as-fabricated composite at room temperature and development of wear mechanism map against EN31 tool steel. 4) Near net shape components fabrication of simple geometries and evaluation of cutting performance of the as-processed composite for mild steel and Ni-base superalloy machining.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Product Manufacturing and Benchmarking should be done. 2. Industry collaboration with tool / ceramic industry is necessary 3. Budget to be revised to Rs 18 Lakhs for 1½ years subject to the condition that PI should submit letter of financial support of at least Five Lakhs of Co-funding from relevant industry /CSIR. 	

20	
Project No.	SNTMOM/845/2022
Project Title	Development and scale up -TRL 5 – of cost effective Copper Graphene materials using in-situ synthesis and coating in Fluidized Bed Process systems
Institution	CSIR Advanced Materials and Processes Research Institute AMPRI
Principal Investigator	TILAK (7906445435, tilak@ampri.res.in)
Project Cost & Duration	Rs. 91,71,500.00 2 Yrs
Objectives of the project	(This is resubmission of SNTMOM/503/2021. Since NFTDC was added as another collaborator after last PERC so freshly submitted again) o Design and development of fluidized bed apparatus for in-situ synthesis of Cu-graphene composite powders and synthesis. o Synthesis of Cu-graphene composite powders using fluid-bed coating o Thermo-mechanical processing of Cu-Gr composites from above routes to obtain PM compacts and mill forms. o Characterization of Cu-graphene composites developed using powders obtained through above routes
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is novel 2. It addresses the emerging copper / carbon materials for high strength and conductivity. 3. The research is of contemporary international calibre in this category of materials. 4. Recommended with revised budget of Rs. 60 Lakhs for 2 years. 	

21	
Project No.	SNTMOM/847/2022
Project Title	Techno-economic Survey of Zinc recycling Industry in India Metal Extraction (Metallurgical processes)
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	RAMAVAJJALA ANIL KUMAR (9491318525, anilkumar@jnarddc.gov.in)
Project Cost & Duration	Rs. 54,09,600.00 1 year
Objectives of the project	To establish techno-economic scenario of zinc scrap recycling in the country
REMARKS/SUGGESTION: RECOMMENDED	
<ol style="list-style-type: none"> 1. Panel noted that JNARDDC has been nominated as MRA for undertaking the functions stipulated in National Non-Ferrous Metal Scrap Recycling 	

<p>Framework, 2020.</p> <ol style="list-style-type: none"> The proposed work of data collection of zinc is crucial. PI should collaborate with International bodies.
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22	
Project No.	<u>SNTMOM/863/2022</u>
Project Title	Process for the preparation of iron oxide nanoparticles and zeolite nanoparticles from iron and bauxite mine rejects and evaluation of products for the environmental applications Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	SUJANA M G (9438399955, sujana@immt.res.in)
Project Cost & Duration	Rs. 57,46,244.00 3yrs
Objectives of the project	<p>Sampling and complete physical and mineralogical characterization of the selected iron and bauxite mine rejects for phase and elemental analysis through XRD, XRF, SEM EDS, TG/DTA and wet chemical analysis, using ICP-OES. Analysis of minor elements such as rare earth elements by ICP-MS. ? To investigate the optimization of the technical parameters for effective recovery of metal oxides by hydro/biometalurgical reaction processes using mine rejects as starting materials. ? Separation, and Preparation of iron oxide nanoparticles /zeolite materials ? Mapping of minor elements distribution in the flow sheet for identification of possible points at which the sub-processes can be made in future. Sink-float studies will be carried out using heavy organic liquids such as bromoform (CHBr₃; specific gravity, 2.89), as a medium for separation of heavier fractions from the lighter one. Methylene iodide (di-iodo methane, 3.3 specific gravity) heavy medium will be used to determine the very heavy minerals and light heavy minerals from the total heavy minerals (sinks) obtained by using the bromoform as heavy medium. ? Characterization of the developed materials by systematic structure characterizations with X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), transmittance electron microscope (TEM), X-ray fluorescence spectroscopy (XRF), X-ray photoelectron spectroscopy (XPS) and DRS UV visible spectra and particle size analysis, BET Surface area and RAMAN spectroscopy. ? To explore the possible utilization of developed materials through modification or as such for the environmental applications by conducting feasibility studies on contaminants (As(III)/(V), Selenium/dye degradation).</p>
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> The project idea is good Panel recommends a seed money of 15 lakhs for a period of 1½ years for 	

- undertaking the preliminary studies.
3. The work should focus on PLK.

23	
Project No.	<u>SNTMOM/865/2022</u>
Project Title	Design and development of an instrument for unmanned noise mapping of mines using a drone-mounted acoustic camera Mining (includes rock mechanics, design, equipments, energy, environment, safety)
Institution	National Institute of Technology Rourkela
Principal Investigator	Dibya Prakash Jena 9938084602, jenad@nitrkl.ac.in
Project Cost & Duration	Duration: 2 Yrs, 0 Mth Cost:1,32,65,500.00
Objectives of the project	The acoustic camera is an advanced instrument that is used for noise source localization and at the National level the competencies don't exist. The said acoustic camera is a general instrument that has been used by researchers for traffic noise localization in complex environments like ports, however, never been attempted for mines. The additional complexity of the mine is geospatial discontinuities. Currently, the noise map of a mine is generated with a sound level meter where the measurements of a few set points is used to estimate the noise map which in principle is not much accurate. So, the present research aims at design and development of an instrument for unmanned noise mapping of mines using a drone-mounted acoustic camera.

REMARKS/SUGGESTION:**RECOMMENDED WITH MODIFICATIONS**

1. Project idea is good and is a move towards digitalization in mining
2. PI submitted consent letter of NALCO for 25% funding.
3. Panel noted that similar work on noise mapping carried out by NIMH in the past was limited to manual data collection followed by modelling in lab for validation.
4. The present proposal aims to develop a drone based mine mapping system which can be handed over to NALCO followed by training to NALCO personnel.
5. The total budget should be pruned down by reducing the number of microphones and data acquisition system accordingly.
6. The panel recommended for a revised budget of Rs. 110 Lakhs with 40% funding by MoM (Rs. 44 Lakhs) and balance 60% by NALCO (Rs. 66 Lakhs)
7. PI advised to submit revised funding letter from NALCO.

24	
Project No.	SNTMOM/885/2022
Project Title	Development of Nanostructure Chalcopyrite Materials as Sustainable Thermoelectric and Supercapacitor Applications
Institution	Hindustan Institute of Technology and Science
Principal Investigator	Indrajit Shown (7596917050, shownindrajit@gmail.com)
Project Cost & Duration	Rs. 50,27,700.00 3 Yrs
Objectives of the project	<p>1. To evaluate the thermoelectric (TE) and supercapacitor (SC) behavior of hierarchically nanostructured chalcopyrite doped heavily by p-type silver. 2. To explore the feasibility of producing a novel thermoelectric and supercapacitor material by using Cd or Se as a ternary addition to form nanostructured chalcopyrite. Attractive TE properties of Zn added chalcopyrite make it appear that the study may discover a high ZT stable thermoelectric material. 3. To develop optimized synthesis techniques by microwave assisted hydrothermal means so as to produce nanostructures (nanowires or nanoplates) by bottom up approaches. Moreover, suitable thermomechanical treatment will be evolved for creating nonuniformity in distribution of nanoprecipitates/ doping elements within nanostructured matrix that helps in modulation doping. Both Mechanical alloying and liquid metallurgy and routes will be tried. 4. To study the effect of fullerene C70 addition on the stability and thermoelectric behavior of TE and SC behavior of chalcopyrite-C70 nanocomposites with or without silver doping. 5. To explore the feasibility of He ion implantation followed by annealing to create homogeneously distributed pores and to study its effect on thermoelectric and supercapacitor properties.</p> <p>Abstract Herein we propose to develop nanostructure chalcopyrite with dopant as universal materials that can be used to generate electrical energy from thermal energy as a thermoelectric generator and store the energy as a structural supercapacitor. It is expected that this material can be used in the structural body of electric vehicles or heat generators with ion-exchanging rechargeable supercapacitors and form a hybrid energy storage system. The use of thermoelectric material to harvest waste heat energy is not new, but if the same material can store that energy, it will be a gamechanger in the field of sustainable energy application.</p>
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea is good. 2. Panel recommends a seed money of Rs 10 Lakhs for one year to work on Supercapacitors to establish PoC and compare the performance with competitive materials in Phase-1 3. No funding for capital equipment. 	

4. Target should cross 40 Wh/kg for energy density

25	
Project No.	<u>SNTMOM/886/2022</u>
Project Title	Recovery of Molybdenum, Nickel and Alumina values from spent hydrotreating catalyst of HPCL and Demonstration at Pilot plant (TRL-7) and techno-economic feasibility studies Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Non Ferrous Materials Technology Development Centre
Principal Investigator	D Lokeswara Rao (9849604852, lokesh@nftdc.res.in)
Project Cost & Duration	Rs. 99,77,000.00 1 yrs 6 Mth
Objectives of the project	Approximately 220 Tons (110 Tons – CoMo/Al ₂ O ₃ , 110 Ton-NiMo/Al ₂ O ₃)/ year from HPCL Mumbai refinery and 230 tons (110tons- CoMo/Al ₂ O ₃ , 120 tons – NiMo/Al ₂ O ₃) /year spent hydro treating catalyst wastes are generated. The typical Mo and Ni content of the spent hydro treating catalyst after use in the refining by HPCL contains 5-15% Mo and 1-5% Nion Al ₂ O ₃ substrate. This spent catalyst was taken for prior work. 1. Development of process flow sheet for recovery of Molybdenum, Nickel/ Cobalt and pure alumina from the spent HDS catalyst. 2. Process intensification techniques of Microwave and sonication to be incorporated in the leaching circuit. 3. Development of a closed loop, zero discharge process without effluent. 4. Achievement of 90% leaching efficiencies with an overall 80% material recovery. 5. Pilot plant at 25 kg level (TRL-7) for demonstration up to 1-ton operations. (Six months) 6. Techno-economic study at DPR for 400 TPY spent catalyst plant (yielding approx. 40 TPY Mo values and 10 TPY of Ni values and 300 TPY of alumina values at HPCL-NFTDC site.
REMARKS/SUGGESTION:	
RECOMMENDED	
<ol style="list-style-type: none"> 1. The project idea is good and will validate the product quality. 2. Prior work is well done on actual materials from HPCL. 3. The deliverables include pilot plant for demonstration up to 1-ton operations for Recovery of Molybdenum, Nickel and Alumina values. 4. HPCL (Industry partner) and NFTDC shall cover 67% of the budget (HPCL – Rs 49 lakhs and NFTDC – Rs. 17.6 lakhs) and PI has sought the balance 33% budget from MoM (Rs. 33.165 Lakhs). 5. HPCL and NFTDC will further scale up to 400 TPY input catalyst plant on successful completion of the pilot plant on this project. 	

26	
Project No.	SNTMOM/900/2022
Project Title	Development of Eco-friendly molten salt extraction process for Nd and Pr and Establishment of 25- 50 TPY Nd and Pr Metal Extraction Demonstration Plant (TRL7-8) for Rare Earth Magnet Production
Institution	Non Ferrous Materials Technology Development Centre
Principal Investigator	Nirmal Panda (9985509736, nirmalpanda@nftdc.res.in) (Non Ferrous Materials Technology Development Centre)
Project Cost & Duration	Rs. 19,52,87,000 2 Yrs
Objectives of the project	WP-1: Design and fabrication of 25-50TPY demonstration Nd/Pr Extraction Plant of 8KA Molten Salt Electrolytic Cell WP-2: Innovative process development in terms of eco-friendliness using coated carbon or non-carbon electrodes. WP-3: Nd/(Nd-Pr) FeB alloy powder using rapid solidification process and process equipment development WP-4: Establishment of demonstration plant: 25-50 TPY entry level plants (TRL 7/8) and demonstration up to 6 tons of metal production.
REMARKS/SUGGESTION: RECOMMENDED	
<ol style="list-style-type: none"> 1. Project Idea is novel and is at higher TRL-7/8 level 2. Industry support is appreciated by panel members 3. PI is seeking only around 15% of total budget from MoM (Rs. 295.35 Lakhs). Balance budget is funded by Midwest Rare Earth – Rs. 13.0284 crores and NFTDC – Rs. 3.5468 crores. 4. The PI informed that an entire team of around 10 members of multi-disciplinary scientists and engineers will execute the pilot plant in 18 months followed by 6 months of operation for validation. 5. The proposal is of national importance. 	

27	
Project No.	SNTMOM/923/2022
Project Title	Pre-feasibility Studies on Biological Extraction of RE (Nd, Pr, Sm, Dy, Gd) ions from leached solutions
Institution	CSIR Institute of Microbial Technology
Principal Investigator	Srinivasan Krishnamurthi (7837306552, kmurthi@imtech.res.in)
Project Cost & Duration	Rs. 20,39,730.00 1 year

Objectives of the project	1)Screening for siderophore producing bacteria from wealth of marine bacterial cultures available with PI research group. Concurrent selection and screening of bacterial cultures in NFTDC suitable for REE biosorption. 2)Establishment of enrichment cultures and/or assays for determining mobilization of REE from mineral ores/wastes. 3)Deposition of selected biomass on Silica spheres to created sorption columns and desorption of immobilized REEs (NFTDC)
REMARKS/SUGGESTION: RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. Project idea for biological extraction of RE is good. 2. The findings will help in determining mobilization of REE from mineral ores/wastes. 3. Recommended with a revised budget of Rs. 15 Lakhs for 1 year 	

28	
Project No.	SNTMOM/557/2021
Project Title	Conversion of natural mineral based tetrahedrite compounds into high performance thermoelectric devices used in the conversion of waste heat into electricity
Institution	Indian Institute of Technology Bhubaneswar
Principal Investigator	SIVAIAHBATHULA (9958923766, sivaiahb@iitbbs.ac.in)
Project Cost & Duration	Rs.42,06,750.00 3 Yrs
Objectives of the project	<ul style="list-style-type: none"> • To develop novel material designing strategies for making the naturally available tetrahedrite minerals as potential thermoelectric materials in clean energy generation applications. • To tune the thermoelectric transport properties (band structure engineering and nanostructuring) of naturally available tetrahedrite (Cu₁₂Sb₄S₁₃) as well as synthetic tetrahedrite minerals. • To perform systematic microstructural, and thermoelectric characterization to optimize the base composition of tetrahedrite. • To scale up the indigenously developed tetrahedrite materials into the thermo-element devices (dimensions, 8 x 8 mm) with ohmic contact engineering (low specific contact resistance). • To fabricate uni-couple thermoelectric devices using natural metal tetrahedrite based un-couple TE device (p-type tetrahedrite with matchable n-type) and to demonstrate reasonable power density (~0.5 W/cm²) with improved mechanical properties (Fracture toughness, thermal shock resistance).
REMARKS/SUGGESTION: RECOMMENDED	

1. The PI complied with suggestion of previous PERC
2. PI should start Synthetic compound along with natural ones.

29	
Project No.	SNTMOM/607/2021
Project Title	Nano Ion-Chromatograph in Action - Sustainable and Scalable Quantum Dots Paves a Facile Route for Rare-Earth Ions Separation Through Advanced Hydrometallurgy.
Institution	Banaras Hindu University
Principal Investigator	Somenath Garai (8400098731, sgarai@bhu.ac.in)
Project Cost & Duration	Rs.1,61,58,500.00 3 Yrs
Objectives of the project	<ul style="list-style-type: none"> • The tunable nature of the concave surface of the Keplerate is truly unique and provides a powerful tool in the design and development of novel nanocontainer molecules. Therefore, the specific objectives to be achieved by this project include: • The use of the Nano-Keplerates as highly efficient rare-earth metal absorber under confinement. • Facile separation of the rare earth metals selectively from the other naturally occurring trivalent cations in the corresponding ores through Nano-Ion Chromatograph behavior of the voltage gated {Mo9O9}-pores of the Quantum Containers. • The evaluation of corresponding Dissociation Constants KD(s) of rare earth metals as compared to the different cations to enable Nano-engineering of the Quantum Containers towards optimization. • The high throughput recyclability of the Novel Quantum Containers will be tested for the bulk real-life Nanotechnology application to finally, set-up of a pilot hydrometallurgical demo unit for upscaling of a minimum of 100 L/Day of raw digested ore solution.
REMARKS/SUGGESTION:	
RECOMMENDED WITH MODIFICATIONS	
<ol style="list-style-type: none"> 1. PI complied with the recommendations of previous PERC 2. Recommended for a revised cost of Rs. 65 Lakhs for 2 years. 3. No capital equipment except for one essential item. 4. For support, NFTDC may be approached for scale up facilities and concurrent engineering 	

5. The following projects were recommended for resubmission to next PERC.**RESUBMISSION TO NEXT PERC – 5 nos.**

1	
Project No.	<u>SNTMOM/634/2022</u>
Project Title	Czochralski growth of Silicon single crystals to produce up to 3-inch wafers with potential for import substitution
Institution	CSIR Institute of Minerals and Materials Technology, IMMT
Principal Investigator	NIRMAL KUMAR VELU (9600973603, nirmalvelu@immt.res.in)
Project Cost & Duration	Rs. 2,25,64,752.00 2yrs
	Czochralski growth process of Silicon single crystals along (111) and (100) planes to produce wafers up to 3-inch size and economic feasibility study for import substitution. The scope of this work are; • Growth Si single crystals along (111) and (100) planes by Czochralski method • Varying crystal diameter from 25 to 80 mm by controlling growth parameters • Process to produce wafers of sizes 1”, 2” and 3” by cutting and polishing of Si single crystals • Production of Si wafers with global standards • Economic feasibility study: calculating the production cost/wafer and comparison with commercial products
REMARKS/SUGGESTION:	
RESUBMISSION TO NEXT PERC	
<ol style="list-style-type: none"> 1. The project idea is good 2. PI should include strategy for development of equipment 3. Proposal should be resubmitted with co-funding of beneficiary industry partner 	

2	
Project No.	<u>SNTMOM/693/2022</u>
Project Title	Development of a V2X-based low-cost fleet management system for opencast mines Mining (includes rock mechanics, design, equipments, energy, environment, safety)
Institution	CSIR Central Institute of Mining and Fuel Research
Principal Investigator	Swadeskumarchaulya 0947119138, chaulyask@gmail.com

Project Cost & Duration	1,15,27,600.00 Duration: 3 Yrs, 0 Mth
Objectives of the project	The objectives of the proposed project: <ul style="list-style-type: none"> i) Development of an integrated V2X and GPS device; ii) Development of an application software for HEMM tracking, navigation, proximity warning, production monitoring, and fleet management; iii) Field trial of the developed system in an opencast mine; and iv) Patent and copyright filing of the developed system and software
REMARKS/SUGGESTION:	
RESUBMISSION TO NEXT PERC	
<ol style="list-style-type: none"> 1. The project idea is good. 2. Members observed that more than 40% budget is being expended for the outsourced work viz computer engineer etc. 3. Proposal should be resubmitted with co-funding of beneficiary industry partner. 	

3	
Project No.	<u>SNTMOM/705/2022</u>
Project Title	COLLABORATIVE AUTONOMOUS MULTI ROBOT SYSTEM BASED GEOSPATIAL DATA COLLECTION, MAPPING AND INSPECTION FOR MINING OPERATIONS
Institution	Indian Institute of Science Bengaluru
Principal Investigator	ABHRA ROY CHOWDHURY (7376469472, ABHRA@IISC.AC.IN)
Project Cost & Duration	Rs. 37,70,800.00 3yrs
Objectives of the project	Design of an Human Collaborative Multi Autonomous (AMS) Team of Land based and Drone robots for Mapping, Navigation and Exploration in Mining Operations (Surface and Underground)
REMARKS/SUGGESTION:	
RESUBMISSION TO NEXT PERC	
<ol style="list-style-type: none"> 1. Project idea is good and is aimed towards digitalization in mining. 2. However, similar robotic work is being done by CSIR-CMERI Durgapur, IIT Kanpur, IIT(ISM) Dhanbad and other organizations, which PI should take into consideration. 3. Panel suggested PI to visit similar mining projects to know the mining 	

environment and constraints 4. Proposal should be resubmitted with co-funding of beneficiary industry partner.

4	
Project No.	SNTMOM/830/2022
Project Title	Investigation of structurally bound invisible gold incorporation process into sulfide minerals and its extraction potential through hydrothermal experimental studies and reactive transport modeling Geosciences and Exploration (Duration: 3 Yrs, 0 Mth) Submitted
Institution	Indian Institute of Technology ISM Dhanbad
Principal Investigator	ALIK SUNDAR MAJUMDAR (7045800260, asmajumdar@iitism.ac.in)
Project Cost & Duration	Rs. 69,19,752.00 3yrs
Objectives of the project	The major objectives of the proposed project are as follows: 1) To carry out a series of hydrothermal experiments between natural sulfides (pyrite, arsenian pyrite, arsenopyrite, and löllingite) and Gold chloride solution with variable AuCl: AuCl ₃ ratios, temperature, pressure, solution pH to understand the control of gold valence state (Au ⁺¹ vs Au ⁺³) on the pattern and mechanism of Au substitution into major gold-bearing sulfide minerals. 2) To compare experimental results with natural samples to interpret the valence state and site preference of gold during incorporation into pyrite, arsenian pyrite, arsenopyrite, and löllingite crystal structures.
REMARKS/SUGGESTION:	
RESUBMISSION TO NEXT PERC	
<ol style="list-style-type: none"> 1. Project idea is good. 2. PI was suggested to involve mineral beneficiation and metallurgy expert to execute project with revised budget. 3. Project should be recast with reduced capital budget. 	

5	
Project No.	SNTMOM/554/2021
Project Title	Micron to Nano Scale Investigation of Platinum group of Minerals in Chromitite of the Indo-Burma-Andaman Ophiolite
Institution	Indian Institute of Science Bengaluru Pondicherry University
Principal	SAJEEV KRISHNAN

Investigator	9448427463, E-mail: sajeev@iisc.ac.in PM Mohan
Project Cost & Duration	Rs. 8909108.00 3 Yrs
Objectives of the project	<ul style="list-style-type: none"> • To explore and locate platinum group of elements (PGEs) texturally in Chromitite and associated ultramafic rocks from Indo-Burma-Andaman ophiolite belt. • To investigate the presence of PGEs and their forms using atomic resolution advanced techniques such as transmission electron microscopy and atom probe tomography. • To investigate the atomic-scale chemistry and structure of the PGEs and their form. • To rationalize the genesis of PGEs in the chromitite sample based on the location and time.
REMARKS/SUGGESTION:	
RESUBMISSION TO NEXT PERC	
PI could not present the project due to unforeseen emergency.	

6. The list of new projects NOT RECOMMENDED is as below:-

These proposals were not recommended as the (i) objectives are very sketchy and methodology not clear or doable; (ii) proposals not directly in the thrust areas, (iii) outcomes are not relevant or impactful, (iv) there is no visible translational potential; (v) similar projects have already been funded, (vi) it could be directly done as a consultancy project with the industry; (vii) preliminary proof of concept is not done; (viii) the proposed work can be done by PI within the facilities available with them and it does not really need a project proposal; (ix) in a few cases PI has not adequate domain knowledge in mining or minerals or lacking a partner with domain knowledge, (x) casual approach to problem definition and a loose connection made between mining, minerals and waste.

NOT RECOMMENDED -57 nos.

1	
Project No.	SNTMOM/253/2020
Project Title	Development of India specific scientific framework to promote the beneficial reuse, rehabilitation or remediation of landscape affected by abandoned mines or flyash ponds or slags
Institution	Indian Institute of Technology BHU Varanasi and other institutes

	Industry Partner - MOIL, Hindalco and Triveni Earth Movers
Principal Investigator	Amit Verma 0778101240 amitvermaism@gmail.com
Project Cost & Duration	Rs. 49,98,000.00 2 Years
Objectives of the project	1. To develop a framework to facilitate a successful transition to mine closure 2. To delineate potential uses of abandoned/inactive mines/fly ash ponds across India 3. To study the impact of rehabilitation on alleviating social, economic and environmental wellbeing of communities living in and around major mining centers in various parts of India.
Remarks NOT RECOMMENDED <ol style="list-style-type: none"> 1. The objectives are very generic 2. Lacks innovation and novelty 	

2	
Project No.	SNTMOM/483/2021
Project Title	Development Of An Integrated Bioprocess For The Enrichment And Separation Of Precious Rare Earths From Phosphogypsum Industrial Wastes
Institution	CSIR National Institute for Interdisciplinary Science and Technology
Principal Investigator	PRATHISH K P 9447798707, prathishkp@niist.res.in
Project Cost & Duration	Rs. 74,73,000.00 3 yrs
Objectives of the project	Rare earth elements (REEs) are of growing interest and their applications cover many fields such as permanent magnets, wind turbines, hybrid cars and mobile phone speakers. The recovery of REEs from both bulk PG waste, as well as leachate is targeted through two entirely different approaches in this project. 1. Bench scale bioprocess development for producing organic acid cocktail for extracting (bio-leaching) REEs from waste phosphogypsum. 2. Exploring the application of a sulphidogenic microbial system for recovering REE from leachates. 3. Biomimetic polymeric resins for the selective separation of REEs from the reaction mixtures 4. Development of Process Flow sheet with material balance and techno-economic feasibility evaluation
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The proposal is not economically feasible based on the preliminary studies presented by PI. 2. The RE content is very low and hence not viable. 	

3	
Project No.	SNTMOM/507/2021
Project Title	A Real-time Ground Vibration Monitoring and Alert System Integrated with Mobile App for Mining Area
Institution	Bannari Amman Institute of Technology
Principal Investigator	SANJOY DEB E Mail- sanjoydeb@bitsathy.ac.in
Project Cost & Duration	Duration: 2 Yrs, 0 Mth Rs.1617600.00
Objectives of the project	<ul style="list-style-type: none"> • The fundamental objective of the proposed project is to design, develop and field trial of real-time 'Ground Vibration Monitoring and Alert System (GVMAS)' prototype for predicting hazards in mining area. The real-time GVMAS will be a highly advanced system which will be technologically derived from basic 'Ground Vibration Detection and Processing Technology (GVDPT)'

	<p>available with us. Under this fundamental objective the sub-objectives are;</p> <ul style="list-style-type: none"> • To design the system hardware, an algorithm for GVMAS prototype * To test the prototype performance at the original 'Field-site' • Design modifications for performance optimization based on test results • To develop a user-friendly dedicated 'Software User Interface' (or App) for creating 'Real-time Vibration Map (RVM)' along with data table on system server (or on mobile) (Our part) * To scale-up the GVMAS prototype by 5 units Implement those for a short phase of field trial
<p>REMARKS/SUGGESTION:</p> <p>NOT RECOMMENDED</p> <ol style="list-style-type: none"> 1. The objective is not reaching blast vibration monitoring system measurement 2. The measurement does not fit into the required standard range of blast induced ground vibration frequency encountered at mines 	

4	
Project No.	SNTMOM/595/2021
Project Title	Rare-Earth Element potentiality of carbonatite breccia or agglomerate from Ambadungar-Saidivasan alkaline-carbonatite complex, India-Phase Two
Institution	Banaras Hindu University
Principal Investigator	Amiya Kumar Samal 09580270209 E-mail: amiyasamal007@gmail.com)
Project Cost & Duration	Rs. 5173308.00 3 Yrs
Objectives of the project	<ul style="list-style-type: none"> • Recommendations of the 19th Meeting of Project Evaluation and Review Committee (PERC): "to carry out the first phase with seed money of Rs.15 Lakhs for one year for desk studies, collection of field samples, identifying mineral phases and chemical analysis. • If encouraging results are obtained, the 2nd phase project may be considered based on review." Based on the highly encouraging results (finding of several REE phases) from the first phase of the project (results attached in document file), the following objectives are proposed for the second phase. • Characterization of different rock units of the Ambadungar-Saidivasan alkaline carbonatite complex (ASACC) by detailed petrography and mineral chemistry. • Identification of different

	<p>phases (by XRD, SEM and EPMA) to assess the presence of REE, Nb-Ta and U-Th bearing phases. Further, the REE phases will be characterized through LA-ICPMS to evaluate the LREE/HREE ratio and genesis.</p> <ul style="list-style-type: none"> To establish a genetic relationship between the different rock units of the complexes, whether they are derived from similar mantle melts or has different genetic histories. This would be done with the help of whole-rock major, trace and rare-earth element compositions of selected samples from different litho-units
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> PI has not followed the recommendation of last PERC for 1st phase work. There was no clarity in the presentation. Chemical analysis/ characterization is not done systematically Quantitative analysis and corresponding information are missing PI needs to complete the phase-1 work as suggested by Committee 	

5	
Project No.	SNTMOM/599/2021
Project Title	Overburden, sand and industrial waste as mine fills and their impact on soil morpho-dynamicity and sustainable developments
Institution	Kalinga Institute of Industrial Technology (KIIT) University, Bhubaneswar
Principal Investigator	BiswabanditaKar Mail-drbbkar@gmail.com
Project Cost & Duration	Rs. 9,61,54,500.00 Duration: 3 Yrs, 0 Mth
Objectives of the project	<ul style="list-style-type: none"> Physical, Chemical, Mechanical and Engineering property estimation of the soil and soil impregnated by overburden, sand and other industrial waste. Process simulation and optimization. Estimation of soil morpho-dynamicity before and after mixing of overburden, sand and other industrial waste. Remedial measures to cease the impact of overburden, sand and other industrial waste on soil property changes. Establishment of soil properties in the landfill sites. • Addition of industrial waste as a landfill material.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	

<ol style="list-style-type: none"> 1. Project lacks Novelty 2. Similar work already done 3. Panel noted that Industrial Partner agreed to contribute 20% of the project cost 4. The cost of the project is not justified.

6	
Project No.	SNTMOM/615/2021
Project Title	Assessment of the impact of mining on the accumulation of potentially toxic and economically important elements in coastal marine sediments
Institution	CSIR National Institute of Oceanography CSIR Central Institute of Mining and Fuel Research
Principal Investigator	KrushnaVudamala 8806640609 E-mail: krushna@nio.org Vikram Singh
Project Cost & Duration	Rs. 3,07,69,532.00 3 Yrs
Objectives of the project	<ul style="list-style-type: none"> • To assess the dispersion of potentially toxic and economically important elements from different mining sites towards the eastern coast of India. • To explore economically important elements (potassium, lithium, strontium zircon, RREs, etc) and potentially toxic elements (lead, mercury, cadmium, etc) in the coastal marine sediments near mining sites of the east coast of India. • Source identification of economically important and potentially toxic elements in the coastal ecosystems near mining sites using geochemical and Isotopic (Stable – C, N, O, Hg, Pb, Radiogenic - Sr, Nd& Radioactive – 210Pb, 226Ra) studies.

REMARKS/SUGGESTION:**NOT RECOMMENDED**

1. The work is more of mineral exploration rather than contamination detection
2. PI has not done proper background work.
3. Budget is not justified.

7	
Project No.	SNTMOM/626/2022
Project Title	Development of a self-healing, electromagnetic interference (EMI) shielding concrete composite utilizing iron tailing and manganese ore

	tailing Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	National Institute of Technology Calicut
Principal Investigator	BlessenSkariah Thomas 9946857587, blessen@nitc.ac.in
Project Cost & Duration	Rs. 4908300.00 3 Yrs
Objectives of the project	<p>This research aims to develop a novel self-healing concrete (ordinary, standard and high strength as per IS 456:2019) solid building block utilizing iron tailing, manganese ore tailing and discarded tire rubber ash (carbon black), which can provide an electromagnetic (EM) shielding of minimum 30 decibels (dB) over a frequency range of 0.1 to 10 gigahertz (GHz). To achieve this aim, the research is outlined into the following objectives: 1) Develop mix designs for the M20 (ordinary concrete), M40 (standard concrete) and M60 (high strength concrete) as per IS 456:2019. Manganese ore tailing (2.5% to 10% of the cement/binder by mass), iron tailings (10-50% of fine aggregate by mass), and discarded tire rubber ash (1% to 5% of the binder/as filler material) will be incorporated to these concretes, and the best combination to be selected by trial mixes. 2) Develop a single or a combination of bacillus (CaCO₃ precipitating) bacteria selected from the mining yards, cement plants, marine and acidic atmosphere to provide self-healing mechanism to the concrete. Investigate the influence of self-healing mechanism on the normal and high strength sustainable concrete blocks. This phase consists of various trial mixes with different bacterial combinations and selecting the best performers. 3) Investigate the properties of the concrete for strength, durability and microstructure. The following properties will be studied: Mechanical properties, Durability properties, Microstructural studies. 4) The shielding potency against electromagnetic frequencies will be tested with an intention to provide an electromagnetic (EM) shielding of minimum 30 decibels (dB) over a frequency range of 0.1 to 10 gigahertz (GHz). The concrete composite exhibiting the higher effectiveness against EM frequencies will be recommended towards IPR and product development.</p>
REMARKS/SUGGESTIONS:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks preliminary work data. 2. There is no focused application and processing cost of wastes although not worked out, but would be high to compete. 	

8	
Project No.	SNTMOM/630/2022
Project Title	Newly developed P rich Organo-Mineral Fertilizer from phosphatic rock for sustainable agricultural application, Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste 2 Yrs
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	NABIN KUMAR DHAL (7978253276, dhalnk@yahoo.com)
Project Cost & Duration	Rs. 4161744.00 2 Yrs
Objectives of the project	Development of P-rich Organo mineral fertilizer an alternative for conventional phosphate fertilizer through use of organic Rock Phosphate amended fertilizer in a sustainable agricultural production system.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Analysis of source material and its mineral composition not done 2. Preliminary work not carried out. 3. Phosphate resources are mainly limited to the state of Rajasthan and to be judiciously used. 	

9	
Project No.	SNTMOM/648/2022
Project Title	USE OF RED MUD AS SORBENT MATERIALS FOR REMOVING ACIDIC GREEN HOUSE GASES Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Indian Institute of Technology Kharagpur
Principal Investigator	Tapas Kumar Bandyopadhyay (9475658924, tapas@rgsoipl.iitkgp.ernet.in)
Project Cost & Duration	Rs. 8105600.00 3yrs
Objectives of the project	The aim of this research will be to develop methodologies for abating the acid/greenhouse gases, that are effective, inexpensive, indigenous, easy to manufacture and deploy, do not produce any hazardous or toxic byproducts and easy to sustain. Hence, the objective may be listed as follows; • To design and develop optimum method to use red mud for

	removal of acid gases • To regenerate the oxide from by-product
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Chemical composition of red mud presented by PI is not proper. 2. The project does not focus on alkaline content of red mud and its impact 3. Red mud contains +25% alkaline water, the processing cost would be high for such limited application. 4. Cost of transportation involved would be very high due to which process will not be viable. 	

10	
Project No.	SNTMOM/651/2022
Project Title	Development of an economically viable process the remediation of Cu mining waste, Recovery of heavy metals and low concentration high value metals Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	NATIONAL EDUCATION FOUNDATION
Principal Investigator	Remya P Narayanan (9902083537, remyapn@gat.ac.in)
Project Cost & Duration	Rs. 4482200.00 3Yrs
Objectives of the project	The main objective of the project is to develop and demonstrate an economically viable process for the recovery of heavy metals from Cu mining waste. To achieve this goal the following methodologies will be followed: ? Collection of mining waste from various plants in India ? Analysis of the collected sample ? Environmental risk analysis of the waste ? A survey of literature on the available processes ? Economic analysis of these processes to evaluate the economic feasibility ? Detailed analysis of current disposal methods in India: the environmental and economic aspects ? Based on the cost calculations design the most promising feasible process to recover heavy metals ? Lab scale optimization of proposed process ? Feasibility of Large scale application
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The PI has based his proposal with copper tailing from outside India. 2. The study must focus on raw materials of Indian origin. 3. Preliminary studies need to be carried out to understand the gap area. 	

11	
Project No.	SNTMOM/653/2022
Project Title	Sustainable Biotransformation of Industrial byproduct Phosphogypsum to industrially Important calcium carbonate Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Goa University
Principal Investigator	Meghanath Shambhu Prabhu (8007390016, mprabhu@unigoa.ac.in)
Project Cost & Duration	Rs. 4884035.37 3yrs
Objectives of the project	Collection and characterization of phosphogypsum waste and characterization of bacterial strain Lysinibacillusphaericus involved in biotransformation of phosphogypsum. 2. Characterization of phosphogypsum biotransformation products (calcite and ammonium sulphate). 3. Process optimization and study of mechanisms of phosphogypsum biotransformation of phosphogypsum biotransformation using the potential isolate. 4. Lab-scale pilot studies for phosphogypsum biotransformation using Lysinibacillusphaericus
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. There is no clarity about the process. 2. Phospho-gypsum which has certain utility as a fertilizer is converted to Calcium carbonate for use in cement industry. 3. Cement industry uses natural Calcium carbonate material available at reasonable price 4. Processing cost to make synthetic Calcium carbonate would not be a viable option. 	

12	
Project No.	SNTMOM/670/2022
Project Title	Development of a low-cost process for removal of Cr(VI) from waste water of chromite mines-Lab scale study Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	Dr. PravatManjari Mishra pravatmanjari@immt.res.in, 9861544056
Project Cost & Duration	Cost 4837200 Duration: 2 Yrs

Objectives of the project	<ol style="list-style-type: none"> i. Studies on efficacy of bio-based nanomaterials towards removal of Cr (VI) from wastewater generated in chromite mines. ii. Process development for the treatment chromite mines wastewater.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The project lacks novelty 2. The objectives of the project are not clear 3. The existing method and proposed method are not defined properly. 	

13	
Project No.	SNTMOM/676/2022
Project Title	Development of Cu-Based ternary alloy for fin-tube resistance welding electrode
Institution	All India Shri Shivaji Memorial Society)
Principal Investigator	BhanudasDattatrayaBachchhav (0985017262, bdbachchhav@aissmscoe.com)
Project Cost & Duration	48.2 Lakhs 3 years
Objectives of the project	a) Development of a novel Cu-based ternary alloy for fin-tube resistance welding electrode by casting process followed by suitable forming operation with improved grain flow to increase life of an electrode. b) Evaluation of Mechanical and Tribological Properties of newly developed alloy. c) Comparative analysis with other welding electrode materials for its longevity. d) Performance evaluation and life expectancy on Profile welding machine (In collaboration with Thermax Ltd., Pune) e) Evaluation of cost benefit to industry
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty 2. No prior work done to establish proof of concept 3. The composition is not identified and process flow sheet may not be feasible 4. PI may contact NFTDC for getting familiarized with similar work. 	

14	
Project No.	SNTMOM/677/2022
Project Title	A novel approach for precious metal recovery from low-grade ores using a combination of Bioleaching-Enhanced Electrokinetic Remediation (BEER) Technology Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Thiruvalluvar University

Principal Investigator	Rajasekar Aruliah (7639186598, rajasekargood@gmail.com)
Project Cost & Duration	Rs. 4489700.00 3yrs
Objectives of the project	The main objectives of the proposed project are to develop an effective bioleaching-enhanced electrokinetic remediation (BEER) technology and to demonstrate its technical advantages by achieving the following targets in a laboratory setting: 1. The Isolation and identification of acidophilic bacteria and cyanogenic bacteria from low- grade ores using molecular technique viz 16S rDNA gene analysis. 2. Evaluation of both oxidative and reductive mineral bioprocessing options for extracting metals from waste materials, using defined consortia of acidophilic bacteria and archaea; 3 To evaluate the optimization of bio-oxidation and bioleaching of low-grade ores using microorganism. 4. Development of bioleaching-enhanced electrokinetic remediation (BEER) technology for metal recovery from low-grade ores.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The PI could not define which raw material is to be used and its composition. 2. Proof of concept needs to be established before any such work. 3. There was no clarity on which mine and which low grade to be focused. 	

15	
Project No.	SNTMOM/683/2022
Project Title	Characterization of Jointed Rock Mass using 3D-Printing Technology and Its Application to Stability Analysis of Mines Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	Indian Institute of Technology Delhi
Principal Investigator	R. Ayothiraman 9868182877, araman@civil.iitd.ac.in
Project Cost & Duration	17925599.510.00 3 Years
Objectives of the project	The following are the objectives of the proposed research project: <ol style="list-style-type: none"> 1. Simulation of complex joint conditions of rock mass using 3D printing technology. 2. Characterization of 3D printed rock mass with complex joint

	<p>conditions using element testing and large-scale testing.</p> <p>3. Development of criterion describing strength behavior of jointed rock mass.</p> <p>4. Analysis of failure of Goaf edge area in Bord and pillar mining in jointed rock roof/pillar conditions.</p> <p>5. Development of guidelines for safety in the golf edge area.</p>
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The objectives and deliverables are not well defined 2. Similar studies already in process. 3. Project lacks validation of parameters 	

16	
Project No.	SNTMOM/685/2022
Project Title	GENERATION OF DESTRUCTIVE WAVE INTERFERENCE TO CONTROL STRUCTURAL DAMAGES DUE TO ROCK BLASTING Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	Indian Institute of Technology ISM Dhanbad
Principal Investigator	Bhanwar Singh Choudhary 9471191374, bhanwarschoudhary@iitism.ac.in
Project Cost & Duration	5816600.00 Duration: 2 Yrs,
Objectives of the project	<ol style="list-style-type: none"> 1. Investigations into the directional effect of blast induced wave propagation in rock mass. 2. Development of Destructive wave Interference techniques for controlling ground vibration for safety of the structures. 3. Numerically simulate the shock wave propagation in rock medium 4. Optimization of blast design to maximize useful energy and overcome the seismic energy
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The objectives and deliverables are not well defined 2. Similar studies already in process and work is generic in nature. 	

17	
Project No.	SNTMOM/687/2022
Project Title	AlxCoCrFeNi based high entropy alloys and studying their high temperature dynamic mechanical behavior.
Institution	CSIR Central Glass and Ceramic Research Institute
Principal Investigator	Saikat Deb Acharya (9433580935, saikat@cgcri.res.in)
Project Cost & Duration	66.1 Lakhs 3 years
Objectives of the project	Objectives: 1. Synthesis of single and dual phase AlxCoCrFeNi high entropy alloys. 2. Study of dynamic behaviour of the alloy under high temperature and strain rate conditions. 3. Optimization of processing parameters through microstructural property correlations. Scope of work: (1) Synthesis of specimens (induction melting) and Records of SHPB tests for optimizing the process parameter. (2) Synthesis of specimens (milling and hot pressed) and Records of SHPB tests for optimizing the process parameter. (3) AlxCoCrFeNi based HEA system with optimized processing parameters based on experimental data from SHPB.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks clarity and problem definition is vague. 2. Applications of the project are not identified. 3. It's more of academic nature 	

18	
Project No.	SNTMOM/690/2022
Project Title	Application of flakes from mine tailings for carbon capture Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	CSIR National Institute of Oceanography pas Kumar Bandyopadhyay
Principal Investigator	Ta SIBY KURIAN (9423889319, siby@nio.org)
Project Cost & Duration	Rs. 7669264.00 3yrs
Objectives of the project	The major objective of the project is to prepare buoyant flakes for oceanographic application, especially for carbon capture. The specific objectives are listed below: <ul style="list-style-type: none"> • Analysis of the composition of mine tailings before preparation of flakes • Preparation of flakes under different coating and baking conditions to study the rate of release of micro- and macro-nutrients • Phytoplankton response to flakes' addition based on incubation experiments
REMARKS/SUGGESTION:	

NOT RECOMMENDED

1. Even through project concept is good, the process would not be effective
2. The objectives are qualitative and does not focus on a target mine waste of particular composition.
3. PI needs to carry out laboratory work internally to find its prospects for a proposal with focus objectives and benefits.

19	
Project No.	SNTMOM /692/2022
Project Title	Development of components for mining applications using powder injection moulding (PIM) or powder metallurgy process
Institution	CSIR Central Mechanical Engineering Research Institute
Principal Investigator	SHRIKANT MADHUKAR DESHMUKH (8147184478, sm.deshmukh@cmeri.res.in)
Project Cost & Duration	82.46 Lakhs 3years
Objectives of the project	a) Development of bimetallic two-colour powder injection moulding process for manufacturing of button bits for usage in mining applications. b) Optimization of Tungsten Carbide (WC-Co) alloy composition for button bits using Powder Metallurgy process and bimetallic powder injection moulding process for mining applications. Brief Outline of the Project with specific technology fall-outs 1. Development of bimetallic two-colour powder injection moulding process which can be used for making button bits. 2. Data generation with respect to the composition of button bits raw material used for mining usages. 3. An alternative process (i.e 2 colour powder metal injection moulding process) along with the existing Powder Metallurgy process to develop bimetallic button bits 4. Skill development and awareness of manufacturing button bits in India by Powder Metallurgy process and bimetallic powder injection moulding process.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Feasibility of the product is not established. 2. PI should have attempted for advanced technologies. 3. No proof of concept. 	

20	
Project No.	SNTMOM/694/2022
Project Title	Engineering Intermetallic phase fraction and spatial location for producing utilization enhanced degradation resistance alloy coatings
Institution	Indian Institute of Science Bengaluru
Principal Investigator	Chandan Srivastava (9900626327, csrivastava@iisc.ac.in)

Project Cost & Duration	25.43 Lakhs 2 years
Objectives of the project	To significantly enhance the corrosion resistance of Zn based electrodeposited alloy coatings (Zn-Ni and Zn-Cr) by engineering volume fraction and spatial distribution of the intermetallic phases (in the matrix phase) in the coating microstructure.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Proposal is more of fundamental in nature. 2. Applied work and evaluation on components is lacking. 	

21	
Project No.	SNTMOM/697/2022
Project Title	Enhancing the Erosion-Corrosion resistance of Mining Pump Components using High-Velocity Oxy-Fuel(HVOF) Sprayed Nickel Chromium-Yttrium Oxide Coating Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	Annamalai University
Principal Investigator	P. Sivaraj 9865032026, cemajorsiva@gmail.com
Project Cost & Duration	Duration: 2 Yrs, 0 Mth Cost 3385000rs
Objectives of the project	<ol style="list-style-type: none"> (i) To Develop high-velocity oxy-fuel sprayed Ni-20Cr2O3/Y2O3 coatings (with appropriate stoichiometric ratio) on mining pump components to enhance erosion-corrosion resistance. (ii) To Develop processing windows to identify feasible working limits of HVOF spray process parameters to attain high-quality coatings. (iii) To Optimize HVOF spray process parameters to attain maximum bonding strength and hardness on the coatings
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The work is generic in nature and lacks proof of concept 2. Similar technology is already available in market 3. There is no clarity on the beneficiary of project 	

22	
Project No.	SNTMOM/703/2022
Project Title	Fabrication of closure caps by recycling of waste 8011 Al alloy chips using powder metallurgy

Institution	NIT Rourkela
Principal Investigator	Debasis Chaira (9438370956, chaira.debasis@gmail.com)
Project Cost & Duration	26.12 Lakhs 3 years
Objectives of the project	Solid state recycling of 8011 Al alloy saw chips using powder metallurgy. • Reduction in green house gas emission and machining cost by producing near net shape closure cap, more energy conservation and higher yield. • Synthesis of powder by planetary milling of 8011 saw chips. • Preparation of powder metallurgy compact and conversion into thin sheet. • Direct conversion of waste 8011 Al saw chips into value added product like closure caps.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Scaling up of project is not possible. 2. High energy process w.r.t other processes making it not viable 	

23	
Project No.	SNTMOM/712/2022
Project Title	Studies on the Pozzolan properties ceramic oxy hydroxides modified Ca rich Fullers earth deposits of Telangana state for low carbon cement applications Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	CSIR National Institute for Interdisciplinary Sciece and Technology
Principal Investigator	S. ANANTHAKUMAR (9497271547, ananthakumars@niist.res.in)
Project Cost & Duration	Rs. 2761508.08 2yrs
Objectives of the project	<ol style="list-style-type: none"> 1. A concerted study of a rare class of “Fuller’s earth” (calcium bentonite) deposits in the Vikarabad, Tandur and Sangareddy districts of Telangana state involving determination of the physical and compositional (bulk chemistry and mineralogy) characteristics of samples at key mine sites. 2. Chemical modifications of the Calcite rich Fuller’s earth mineral deposits by providing mixed hydroxy-hydrate phases, mainly using Boehmite (AlOOH)/MgO-OH and produce reactive, cementitious products. 3. Thermal activation of chemically modified Fuller’s earth mineral deposits at <350oC to obtain hydrated clays and formulate low-carbon cement by blending into hemi hydrated gypsum 4. Study the material for curing, mechanical strength, water absorption, wet-strength and density properties and validate for eco-friendly green cement and concrete technology applications 5. Amine activation of Fuller’s Earth deposits to utilize as Industrial sorbents for CO2 adsorption and demonstrate Honeycomb CO2 sorbents module.
REMARKS/SUGGESTION:	

NOT RECOMMENDED

3. Project lacks novelty.
4. Not clarity about raw material

24	
Project No.	SNTMOM/713/2022
Project Title	Extraction of metals from bauxite waste economically and utilization of the material after extraction Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Vidya Bharati Educational Trust
Principal Investigator	Manoj Kumar Sahu (9439843878, manoj.sahu.pdm@gmail.com)
Project Cost & Duration	Rs. 3446950.00 3yrs
Objectives of the project	Extraction of iron and titanium by a cost effective method ? Characterization of extracted iron and titanium and the waste residue ? To evaluate the mechanism of the process ? To develop an engineering prototype incorporating the results of the experiment ? Utilization of waste for value added product left after extraction of metals
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The objective is not focused. 2. Raw material has not been properly studied with regard to its composition 3. Addressing of alkali could not be clarified as no preliminary work done. 	

25	
Project No.	SNTMOM/715/2022
Project Title	Developing an integrative approach of geophysical exploration with simultaneous application of polarization sensitive hyper spectral imaging and HVSR method assisted by machine learning Geosciences and Exploration
Institution	Tezpur University
Principal Investigator	Rajib Biswas (9954313970, rajib@tezu.ernet.in)

Project Cost & Duration	Rs. 6705250.00 3yrs
Objectives of the project	a) Development of an automated prototype assisting polarization sensitive hyperspectral imaging device to capture a large field of view b) Exploring the mineral content or deposits in test field through the developed system c) Ambient noise recordings with analysis via horizontal to vertical spectral ratio technique on sites determined by hyperspectral imaging and its subsequent correlation using machine learning based analysis
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Objectives and deliverables are not well defined 2. Similar technology is available in market 3. The project is more of theoretical research rather than of practical use 4. PI is not aware about end user 	

26	
Project No.	SNTMOM/728/2022
Project Title	Development of Eco-friendly Delivery system for utilizing Gold Ore Tailings of KGF as Micronutrients Source in Agriculture
Institution	Hindustan Institute of Technology and Science
Principal Investigator	Prakash S S
Project Cost & Duration	78.1 Lakhs 3 years
Objectives of the project	Gold ore tailings (GOT-crushed rock with water) are the wastes generated after gold ore mining, mineral processing and extraction activities. During the process of gold nearly 99 per cent of the extracted ore go as waste to the environment and is stored near the mining area. These tailings are rich source of plant micronutrients viz., zinc, iron, manganese, copper, cobalt, nickel that plays essential and beneficial role in plant metabolism. However, they are also loaded with heavy metals viz., arsenic, cadmium, lead, mercury and cyanide that pave the way for their release to the ecosystem leading to widespread contamination of water, soil and atmosphere, if not treated scientifically. The abandoned site of Kolar Gold Mine, which has around 33 million tons of tailings, is posing threat to the environment. Hence, the present project is proposed to develop scientific protocol for utilizing this solid waste as micronutrients source by detoxifying or inactivating heavy metals. The physical, chemical and biological processes either individually or in combinations will be used for developing eco-friendly GOT products for delivering it as micronutrients source to agriculture. The objectives intended to achieve are 1. Characterization of GOT for their distribution and quantification of micronutrients and heavy metals for understanding their bioavailability 2. Development of techniques for

	granulation and bio-encapsulation using organic molecules for controlled availability of micronutrients from GOT 3. To develop protocol for stabilization of heavy metals using in GOT 3a. Chemical modification of heavy metals in GOT to less soluble form 3b. Heavy metal sequestration using effective microbial strains 4. Validation of GOT products under field condition, bio-encapsulated and physico-chemically stabilized GOT granules with effective microbial consortia, for its eco-friendly delivery to soil and crop system as micronutrients source
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. No clear POC. 2. PI may approach NFTDC to study micronutrients in tailings solution to establish POC. 3. PI should undertake extensive prior work. 	

27	
Project No.	SNTMOM/731/2022
Project Title	DEVELOPMENT OF MULTIFUNCTIONAL ARTIFICIAL COARSE AGGREGATE BY UTILIZING ZINC AND ALUMINIUM WASTE MATERIALS. Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste (Duration: 3 Yrs, 0 Mth) Submitted
Institution	VELLORE INSTITUTE OF TECHNOLOGY
Principal Investigator	S.ELAVENIL (9840237492, elavenil.s@vit.ac.in)
Project Cost & Duration	Rs. 2261700.00 3yrs
Objectives of the project	1. By the process of cast moulding and pelletization the aluminum and zinc industry mine waste by-products initially in powder form will be transformed to the size of the coarse aggregate. Further by conducting various curing processes, the artificial aggregate will gain strength and durability properties. 2. Though the coarse aggregate state is achieved by the above process, in an attempt to further develop its physical and chemical properties, The artificial aggregate in the amorphous state will be transformed into crystalline nature. 3. The main purpose of a conventional coarse aggregate is to provide strength and durability to concrete, but with these artificial aggregates additional properties like thermal resistance and electrical resistivity will be incorporated with the help of various additional minerals present in the selected mine waste materials, various treatment will be conducted to improve these additional parameters in the artificial aggregate making it a multi-functional aggregate. 4. The developed aggregate will undergo extensive

	microstructural analysis using a Scanning electron microscope, and X-ray diffraction. by which the bonding strength and pattern of the minerals in the developed artificial aggregate will be studied. 5. As the aggregate has electrical and thermal properties the aggregate incorporated concrete will be tested for the high voltage withstanding capability and thermal behavior so that the aggregate limitation can be exploited. 6. The artificial aggregate incorporated concrete will undergo various laboratory experiments such as rapid chloride penetration, freeze and thawing cycles, chloride ion infusion, compressive and tensile strength tests to identify the strength and durability limit of the artificial aggregate incorporated concrete.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty 2. Similar studies are already reported 3. Jarosite is already used for building material. 	

28	
Project No.	SNTMOM/734/2022
Project Title	Green extraction of iron – multiscale analysis of Hydrogen based direct reduction (HyDR) of hematite and wustite Metal Extraction (Metallurgical processes)
Institution	Indian Institute of Technology Delhi
Principal Investigator	Prateek Gupta (9289188977, prgupta@am.iitd.ac.in)
Project Cost & Duration	100.36 Lakhs 3 years
Objectives of the project	1. Develop a framework for diffusion and phase-transformation and use it to implement molecular simulations to study the adsorption of hydrogen on the surface of iron-ore pellets, diffusion of hydrogen and oxygen radicals into the iron-ore, and phase-transformation of hematite to w "ustite to α -Fe. 2. Upscale the information obtained from molecular simulations into pellet-scale phase field simulations of redox kinetics. 3. Predict the ideal operating conditions in terms of ore size, temperature, and hydrogen gas pressure under which the process is most efficient.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Proposal is more of fundamental in nature. 2. PI may explore funding agencies such as DST / Ministry of Steel. 	

29	
Project No.	SNTMOM/737/2022
Project Title	Exploitation of Mine Wastes from Tamil Nadu Magnesite Limited in Connection with Biorecovery of Mg, Fe and Mn as Growth Promoting

	Plant Minerals through Redox and Adsorption Process Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Periyar University
Principal Investigator	P.M. AYYASAMY (9486327103, pmayyasamy@gmail.com)
Project Cost & Duration	Rs. 4123150.00 3yrs
Objectives of the project	Determine available minerals Mg, Fe and Mn in the mine wastes from the Tamilnadu Magnesite Limited, Salem District by appropriate Methods. To find out Microbial consortium developed earlier in the Bioremediation Laboratory, Periyar University capable of Mg, Fe and Mn mineralization using Mineral Salts Medium enriched with respective elements To study a batch process on the mineralization of Mg, Fe and Mn from synthetic mineral oxide with suitable carbon source, nitrogen source, temperature and pH. To study biomineralization and the extraction of Mg, Fe and Mn from synthetic mineral oxide and magnesite mine wastes through a fixed bed column and field approach. To confirm biomineralization of Mg, Fe and Mn by the microbes with SEM, EDX and FTIR analysis To study the application of Mg, Fe and Mn as growth endorsing minerals for the plant growth and their root molecules..
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty 2. Chemical composition of raw material is not clear and lacks economic assessment. 3. PI is not clear about the process steps and operation 	

30	
Project No.	SNTMOM/753/2022
Project Title	Bioremediation of manganese from a low-grade ore. Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Birla Institute of Technology and Science Pilani
Principal Investigator	Srikanth Mutnuri (9421243443, srikanth@goa.bits-pilani.ac.in)
Project Cost & Duration	Rs. 4847744.12 2yrs
Objectives of the project	Physical survey for site selection and chemical analysis of ore from selected site. 2) Isolation of chemolithotrophic microorganisms 3) Lab scale bioremediation experiments: batch and column and analyzing manganese before and after bioremediation process 4) Scale up and Pilot Scale demonstration
REMARKS/SUGGESTION: NOT RECOMMENDED	

1. Project lacks novelty
2. The process is not established in India and it requires large space for operation
3. Industry partner for such proposal is essential for consideration.

31	
Project No.	SNTMOM/765/2022
Project Title	Development of New Functional Cement Composites using Graphene synthesized from used Graphites for Special Applications
Institution	CSIR National Institute for Interdisciplinary Sciece and Technology
Principal Investigator	JAYASANKAR K (9778060563, jayasankar@niist.res.in)
Project Cost & Duration	57.16 Lakhs 2 years
Objectives of the project	The broad objective of this project is to develop an effective and scale up process for the mass production of graphene kg/batch from used graphites (battery and crucibles) and its application for making graphene based low cost conductive concrete and acid resistance of construction materials. The characteristics of used graphite's will be evaluated which would enable to adopt suitable physico-chemical separation technique to reduce the silica and iron and other impurities as an enrichment step, prior to the subsequent exfoliation processes. Based on the lab scale exfoliation process developed by NIIST, the next level of scale up of the process in kg/batch will be developed in this project and optimize the parameters for the used graphites for graphene production. Development of graphene incorporated cementitious composite and assessment of electrical , mechanical properties and • Investigation of efficiency of graphene incorporated cementitious composite for special functions like electrical conductivity and chemical resistance. . The proof of concept of the proposed work is attached as Annexure. (Pg No: 8-11)
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Projects of similar nature have been adequately funded earlier to the same institute 2. No Scalability has been done with earlier projects funded by MoM. 	

32	
Project No.	SNTMOM/767/2022
Project Title	Synthesis of new collectors for the beneficiation of oxide and sulfide ores of base metals Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste (Duration: 3 Yrs, 0 Mth)

	Submitted
Institution	SARANATHAN ACADEMY OF HIGHER EDUCATION
Principal Investigator	NATARAJAN, R. (9790912713, natarajan-rd@saranathan.ac.in)
Project Cost & Duration	Rs. 5129200.00 3yrs
Objectives of the project	<ul style="list-style-type: none"> • Synthesis of a new series of chelating collectors namely, aminothiols that float both oxide and sulphide ores of base metals. • The new collector has more selectivity for valuable minerals than gangue minerals such as pyrite, clay, silica etc. • The new collector floats zinc without activation using copper sulphate. In case of zinc suppressed during flotation of lead in the case of Pb-Zn ores, floats zinc with reduced copper sulphate. • Copper sulphate being corrosive and expensive its elimination or reduced usage will increase the environmental compliance of the process and reduce corrosion of machinery. • Recovery of low amount of silver present in some of the Pb-Zn ore will also be tested. • A scientific method of selection and synthesis of flotation collectors will be developed to avoid any trial-and-error method.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty with no preliminary work. 2. Proof of concept is not established. 	

33	
Project No.	SNTMOM/774/2022
Project Title	Development of novel sacrificial electrode based on Al-Mg alloys for the application of Aluminum Air Batteries
Institution	Indian Institute of Technology BHU Varanasi
Principal Investigator	Nikhil Kumar (8433149991, nikhil.mst@iitbhu.ac.in)
Project Cost & Duration	25.95 Lakhs 2 years
Objectives of the project	<p>(1) The electrode (better discharge efficiency and negligible self-corrosion rate) based on Al-Mg based alloys will be developed for the Al-air batteries for the electric vehicles application. (2) The new production process route will be identified for further improving the discharge performance of the Al-Mg based alloy electrode. (3) The effect of metallurgical factors (such as grain size, dislocations, etc) on the discharge performance of the Al alloy anode will be investigated. (4) The optimized thermo-mechanical process will be identified for further improving the discharge performance of the Al alloy-anode. (5) The improvement in the discharge efficiency and hinder in the self-corrosion rate of the anode will be obtained through introducing the nano-scale precipitates. The optimized size and volume fraction of the</p>

	precipitates required for improving the anode discharge efficiency will be identified through experimentally and theoretically. (6) The relationship between the corrosion product and texture, and influence of the discharge product and texture on the discharge performance of anode will be investigated. (7) The green corrosion inhibitors for the brine and alkaline electrolytes will be investigated for suppressing the self-corrosion of the aluminum anode. (8) Understanding of the active sites on the surface of the Al alloy anode during application will be investigated through the detail microstructural investigation.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Objectives are vague 2. No Clarity in terms of final product. 3. No proof of concept. 	

34	
Project No.	SNTMOM/780/2022
Project Title	Operative utilization of Granite powder generated from mines and mining industries Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	B M SREENIVASIAH EDUCATIONAL TRUST
Principal Investigator	P Velumani (9842760260, vels.velumani@gmail.com)
Project Cost & Duration	Rs. 3141491.00 3yrs
Objectives of the project	Well-prepared granite waste can be used as coarse aggregate and fine aggregate and as a constituent in building materials. ? The morphological parameters of the aggregates were determined. ? Economic analysis of the disposal of granite waste was carried out. ? The type of the aggregate had an influence on the properties of the concrete. ? The new SCM induces no changes in C-S-H gel product morphology. ? Low concentrations of the waste can be regarded as feasible new SCM.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty 2. Granite powder is targeted to use with fly ash for construction material. 3. Fly ash is already used as a potential construction material 4. Preliminary work needed to find product application potential. 	

35	
Project No.	SNTMOM/782/2022

Project Title	Development of Anti-Corrosion Aluminium Alloy Based Metal Matrix Composite Reinforced With Industrial Waste Material for Naval Application Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Vidya Bharati Educational Trust
Principal Investigator	AJIT KUMAR SENAPATI (9437783220, ajits@giet.edu)
Project Cost & Duration	Rs. 6067000.00 3yrs
Objectives of the project	1. Production of Aluminium alloy based MMC reinforced with ferrochrome slag by stir casting method. 2. Evaluation of the properties such as physical, mechanical, tribological and corrosion of developed MMC. 3. Prototype development of naval components by using indigenously developed MMCs 4. Comparative analyses of the properties of the newly developed prototype with the existing naval components.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. PI will be using red mud with aluminium to make composite whereas aluminium has a good market 2. No preliminary work established or validated 3. Industry support both financially and technically required to consider such project. 	

36	
Project No.	SNTMOM/785/2022
Project Title	Smart Mineral Exploration to Locate and Exploit New Mineral Resources Geosciences and Exploration
Institution	Anna University
Principal Investigator	Roselin (9488515751, roselin.js@auttv1.ac.in)
Project Cost & Duration	Rs. 5232000 3 yrs
Objectives of the project	India has a high geological potential for minerals. Most of the minerals on or just below the surface have been located and there is a need to look deeper for concealed mineral deposits. This means conducting mineral exploration on a continuous basis through the latest technologies. Thus a clear need was seen in the mineral exploration to introduce three dimensional (3D) imaging of the sub-surface, which meant developing methods of both acquiring data and visualizing it.
REMARKS/SUGGESTION:	

NOT RECOMMENDED

- 1) Objectives and deliverables are not clear
- 2) The procedure is not aligned with the objectives.
- 3) No proof of concept and work methodology was not well defined

37	
Project No.	SNTMOM/791/2022
Project Title	Remediation of chromite mine overburden and wastewater of Sukinda Valley, Odisha using nanoparticle assisted biochar obtained from thermo-chemical conversion of agro-industrial wastes
Institution	Tezpur University
Principal Investigator	RUPAM KATAKI 9435380921, rupam@tezu.ernet.in
Project Cost & Duration	6245520.00 Duration: 3 Yrs, 0 Mth
Objectives of the project	1. To produce biochar utilizing low-value biowastes arising from agri-food Industries followed by chemical activation of the produced biochar and their detailed characterization: Morpho-physiological properties of both the pristine and activated biochar will be studied by FTIR spectroscopy, XRD analysis, BET (Brunauer–Emmett–Teller) surface area analysis, SEM analysis etc. 2. To evaluate the adsorption potential of hexavalent chromium [Cr(VI)] by the biochar and its reusability: The Cr(VI) adsorption potential of the biochar at different parameters like biochar dose, initial Cr(VI) concentration, initial pH, particle size of biochar, temperature, and contact time will be tested. The biochar will be reused for multiple cycles to check the adsorption potential. 3. To analyse Cr(VI) adsorption potential of biochar from the chromite mine overburden and wastewater of Sukinda Valley, Odisha. According to the Indian Bureau of Mines, 96% of total chromite ore in the country is present in Sukinda in Jajpur district of Odisha..
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty and deliverables are not convincing 2. Similar work already done 3. Project proposed was of fundamental material science research rather than translational R&D 	

38	
Project No.	SNTMOM/788/2022
Project Title	PROCESS INTENSIFICATION OF BENEFICIATION OF FINE METAL OXIDES BY REDUCING BACKMIXING IN A MICROSTRUCTURED

	FLOTATION COLUMN Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	Indian Institute of Technology Guwahati
Principal Investigator	Subrata Kumar Majumder (9954864735, skmaju@iitg.ac.in)
Project Cost & Duration	Rs. 2126350.00 3yrs
Objectives of the project	i) Development of plant prototype for fine particle separation, (ii) Stability of bubble and its size distribution in microstructured flotation column (iii) Studies on particle–particle interactions with different collectors and at pH by measuring the zeta potential changes, (iv) Degree of reduction of backmixing and its effect of particle-bubble interaction to find out the degree of separation of fine particle (v) Study the performance of microstructured flotation column for the separation of a selective binary fine metal (Ni, Cu (II), Zn and Al (III)) oxide (vi) Study the kinetics of fine particle flotation in microstructured flotation column.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The proposal is design of a flotation column 2. PI should undertake preliminary work to establish proof of concept using some target mineral 3. PI may approach DST for such design concept project 	

39	
Project No.	SNTMOM/794/2022
Project Title	Design, Development and Simulation of Material Feeding System for transportation of large particles through pipeline Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	Kalinga institute of industrial technology
Principal Investigator	AKSHAYA KUMAR ROUT 09437756207, akroufme@kiit.ac.in
Project Cost & Duration	Duration: 3 Yrs, 0 Mth 4980000.00
Objectives of the project	Comprehensive scientific study and modelling of material feeding system for the transportation of large particles through pipelines (a)To design and develop material feeding systems based upon their mechanical integrity and stress pattern through modelling & simulations and by proctographic, micrograph and metallographic study to assess their life in service with a view to increasing its life

	span. (b) To minimize the capital investment in the procurement of mine material feeding system attachments and in the rework (c)To avoid unexpected component failure and premature replacement of components prior to the end of their useful life (d)To make the Bharat AATMANIRBHAR
Remarks NOT RECOMMENDED <ol style="list-style-type: none"> 1. Project work is of academic interest 2. No novelty and research innovation 3. Objectives and deliverables not clear 	

40	
Project No.	SNTMOM/806/2022
Project Title	Studies on transportation of mineral-ore particles (up to 20 mm) from open cast mines through slurry pipeline Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	JAYANTA KUMAR POTHAL
Project Cost & Duration	Duration: 2 Yrs, 0 Mth 6430000.00
Objectives of the project	Design and installation of an appropriate hydraulic transport system for transportation of minerals/ore particles (up to 20 mm) through slurry pipeline. - CFD modelling to simulate flow conditions in the pipeline with pressure drop modeling & empirical modeling of the system. - Analysis of degradation rate of ore/mineral samples influenced by flow velocity, interfacial slip
Remarks NOT RECOMMENDED <ol style="list-style-type: none"> 1. Project aims at generic studies and lacks novelty 2. PI should have visited open cast mines while drafting the proposal 3. PI is not aware of materials which is to be transported 	

41	
Project No.	SNTMOM/815/2022
Project Title	Design and Development of an unmanned electric shovel system for excavation trajectory planning in open pit mines Mining (includes rock mechanics, design, equipment's, energy, environment, safety)
Institution	National Institute of Technology Rourkela

Principal Investigator	J SRINIVAS 9556713217, SRINIVASJ@NITRKL.AC.IN
Project Cost & Duration	Duration: 3 Yrs, 0 Mth 2506700.00
Objectives of the project	1. Dynamic modeling of electric shovel with respect to ore location 2. Optimization studies of trajectory to minimize the time and power requirements 3. Fabrication and testing of scaled model and real time implementation in open and underground mining)
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. It is a fundamental research proposal 2. Objectives and deliverables are not clear 3. This is not a translational work. 	

42	
Project No.	SNTMOM/827/2022
Project Title	Development of an automated mineral detection system using underwater hyperspectral imaging for deep-sea mining Geosciences and Exploration
Institution	Indian Maritime University Navi Mumbai Campus
Principal Investigator	G. VEERA SENTHIL KUMAR (9789554775, veerasenthilkumar@imu.ac.in)
Project Cost & Duration	Rs. 2436965.69 2yrs
Objectives of the project	To develop the Underwater Hyper spectral Unfixing algorithm and design a prototype for mineral detection. To pre-process the images using a suitable Dimensionality Reduction technique for subsequent analysis To extract the end members' signatures and estimate the abundance fraction using deep convolutional neural networks. To validate the results obtained using the proposed method with ground truth data. To implement the developed algorithm in FPGA-based reconfigurable computing.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Objectives and deliverables are not clear 2. No proof of concept 3. Lack of novelty and its more of a conceptual work 4. There is no clarity about adopted methodology and deliverables 5. NIOT Chennai has already done similar work. 	

43	
Project No.	SNTMOM/838/2022
Project Title	Development of Extraction process for Neodymium and Neodymium-Iron alloy by molten salt electrolysis of oxides.
Institution	International Advanced Research Centre for powder Metallurgy and New Materials
Principal Investigator	B. V. Sarada (9963978039, sarada@arci.res.in)
Project Cost & Duration	49.6 Lakhs 3 Yrs
Objectives of the project	A rapidly expanding market for Nd-Fe-B permanent magnets has created intense interest in development of an efficient process for producing Nd metal and NdFe alloy. However, presently, Nd metal is not being produced in India. The present proposal involves development of Neodymium and Neodymium-Iron alloy by an efficient and environmental friendly molten salt electrolysis of oxide. Although there are many processes, oxide molten salt electrolysis is more suitable for the economic mass production of metals of higher quality, with lower oxygen content and fewer impurities. The main objectives are as follows: 1. Development of Neodymium (Nd) from its oxides using fluoride/chloride electrolytic bath by a sustainable molten salt electrolysis (MSE) process. 2. Design and development of the electrolytic cell for the molten salt electrolysis of Nd and NdFe with high efficiencies. 3. Investigation of the electroreduction processes taking place at the cathode and to elucidate the reduction mechanism of neodymium. 4. Use a reactive Iron anode in order to eliminate the evolution of Carbon monoxide (CO), carbon dioxide (CO ₂) and PFCs (polyfluorocarbons) during the electrolysis thus reduce the greenhouse gases and simultaneously form NdFe alloy. 5. Optimization of process parameters, temperature of the molten salt and the composition of electrolytes (fluoride/chloride) and electrolyte additives during the MSE process. 6. Study of microstructural, morphological and chemical properties of the alloy formed. 7. Evaluation of the alloy and conversion to NdFeB master alloy by vacuum induction melting process..
REMARKS/SUGGESTION:	
<ol style="list-style-type: none"> 1. The proposed methodology with Fe as Anode will not work and it has been abandoned at industrial scale. 2. Nd, Pr extraction by molten salt electrolysis already being done by other research groups at high TRL levels. 	

44	
Project No.	SNTMOM/851/2022
Project Title	Direct upcycling of iron ore tailing slurry for reducing the disposal into tailing ponds, through a novel geopolymeric material Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste

Institution	Indian Institute of Technology Indore
Principal Investigator	Sandeep Chaudhary (9549654195, schaudhary@iiti.ac.in)
Project Cost & Duration	Rs. 2984100.00 3yrs
Objectives of the project	<p>The project aims to directly upcycle the iron ore tailing slurry and reduce its disposal into tailing ponds. The slurry will be upcycled into a novel Fe-rich geopolymer, which will utilize all major components of iron ore tailings, i.e., iron-rich minerals, alumino-silicates and water. Through wholistic utilization of iron ore tailing slurry and slurry-based transport, the project aims to develop a commercially beneficial industrial process, as an alternative to tailing ponds. The overall aim of the project can be broken down as the following objectives: 1. Complete physical, chemical, mineralogical and rheological characterization of iron ore tailing slurry from different iron mining sites. 2. Development of a novel Fe-based geopolymer, using iron ore tailings slurry. 3. Evaluation of iron ore tailing slurry based geopolymer for rheological, hardening, strength, and durability properties as per relevant standards. 4. Optimization of iron ore tailing slurry based geopolymer to produce a ready to use construction material (inspired from ready mix concrete and self-compacting concrete) 5. Identification of an economically viable slurry transportation mechanism, for direct upcycling of iron ore tailing waste before its disposal into tailing ponds 6. Simulation-based sustainability assessment of proposed slurry management as compared to the ongoing practice of tailing ponds, to demonstrate the economic and environmental advantages 7. Development of an industry-oriented guideline for setting up new economic ventures based on the direct upcycling of iron ore tailings The target mine for the study will be selected from Agariya Iron Ore Mine (Jabalpur), Dubiyara Iron Ore Mine (Jabalpur) or Pindrai Iron Ore mine (Katni), due to its proximity to the investigating institute.</p>
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. No novelty as similar work being done. 2. Comparative study of various tailings not done, so no proof of concept. 3. PI was informed to interact with NMDC / TATA / other Mining companies for preliminary work. 	

45	
Project No.	SNTMOM/859/2022
Project Title	PARADIGM SHIFT IN DESIGN OF LEACHING IN MINERAL PROCESSING- AN IMMENSE SOURCE OF ELECTRICAL ENERGY Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	National Institute of Technology Trichy

Principal Investigator	Sarat Chandra Babu Jakka (9486771039, sarat@nitt.edu)
Project Cost & Duration	Rs. 3961802.00 3yrs
Objectives of the project	1) Evaluation of primary parameters using electrochemical impedance spectrometry studies on electrical energy production in a laboratory cell. 2) Screening of suitable electrode material with acceptable performance characteristics Preparation of electrode materials sourcing from low cost biomass, available locally and evaluation of physical and functional characteristics 3) Design of flow cell membrane electrode assembly (MEA) with instrumentation to monitor and regulate the process parameters 4) Evaluate the sensitivity of process parameters on leaching efficiency and electrical energy generation 5) Optimize the process conditions for maximizing the leaching efficiency and electrical energy to acceptable levels. 6) Evaluate the sensitivity and safety parameters and scaling parameters fulfilling the criteria of Lab-to-Business concept. 7) Design a demonstration unit of suitable capacity in consultation with any agency showing interest for testing the performance at plant level.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty. 2. There is no schematic diagram to understand the process, it has no clarity 3. At present maximum copper is recovered from ore by HCL and if such leaching process proposed to be taken up, then PI needs to get associated with an industry partner 	

46	
Project No.	SNTMOM/862/2022
Project Title	Development of process for making high pure silicon from low grade quartz Metal Extraction (Metallurgical processes)
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	ALOK TRIPATHY (9437066723, atripathy@immt.res.in)
Project Cost & Duration	47.7 Lakhs 2 Yrs
Objectives of the project	The following is the objective of the study proposed ? Preparation of high pure silicon from low grade quartz
REMARKS/SUGGESTION:	
NOT RECOMMENDED	

1. Project lacks clarity and detailing of process steps for silica to silicon
2. Silica to silicon process flow sheet is very well established at commercial production scales and hence basic R&D is not required.

47	
Project No.	SNTMOM/868/2022
Project Title	Development of cost-effective 3D high-resolution ambient seismic noise imaging technique using fiber-optic interrogator for mineral exploration Geosciences and Exploration (Duration: 3 Yrs, 0 Mth)
Institution	Indian Institute of Technology Bombay
Principal Investigator	Satish Maurya (9372011131, smaurya@iitb.ac.in)
Project Cost & Duration	Rs. 17920547.92 3yrs
Objectives of the project	1. Development 3D high-resolution ambient noise tomography tool which includes following steps: Measurement of Green Function's and dispersions curves for all receivers pair; Development of regionalization technique for exploration scale and preparation of tomographic maps at different frequencies; Obtained the shear wave velocity model using Bayesian trans-dimensional approach. 2. Make a realistic 3D synthetic test modelling for validation 3. Delineation of mineralized zone from 3D shear wave velocity model and k-mean cluster analysis approach.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. There is no innovation in this project 2. PI has not identified the targeted exploration area 3. Overall budget of project is very high, as equipment itself cost around 1.45 crores; some of the required instruments might be available in the institute 	

48	
Project No.	SNTMOM/888/2022
Project Title	Dry beneficiation process using tribo-electrostatic method for removal of unwanted silica from low grade limestone, design and development of tribo-electrostatic separator. Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste (Duration: 3 Yrs, 0 Mth) Submitted
Institution	Indian Institute of Technology Jodhpur
Principal Investigator	Vikky Anand (7409935252, vikky@iitj.ac.in)
Project Cost & Duration	Rs. 11334106.40 3yrs
Objectives of	Removal of silica (SiO ₂) from the limestone or raw mix to the maximum

the project	extent possible, so that consumption of high grade limestone is eliminated/reduced to the possible extent. I. Developing a fundamental knowledge about the course to understand the dependence of the individual parameters on tribo-electrostatic separator. II. Optimization of both operating and separator design parameters. III. Design of lab scale separator: the different design configurations will be tested such as horizontal setups, vertical, or any possible integrated model. IV. Design and development of semi-pilot scale plant. V. Reporting the data of the experimental separation efficiency of the lab scale setup. VI. Training undergraduate, and postgraduate students in the area of electrostatic application of solid-solid separation process
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project objectives are not focused and lacks proof of concept. 2. PI has not undertaken the work of analysis and liberation of characteristics of limestone. 3. PI should initially try in similar system available in NML /IMMT before investing on the equipment and to get familiar with the R&D / equipment available. 	

49	
Project No.	SNTMOM/890/2022
Project Title	Utilization of Khetri Copper Mine Tailings for Fabrication of Sulfide Functionalized Fe ₃ O ₄ Nanocomposites and its application for Selective Recovery of Copper from Low-Grade Ore Tailings Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste (Duration: 3 Yrs, 0 Mth) Submitted
Institution	Central University of Rajasthan
Principal Investigator	Ritu Singh (9602127352, ritu_ens@curaj.ac.in)
Project Cost & Duration	Rs. 6963530.00 3yrs
Objectives of the project	i) Pre-concentration of ferric ions from copper mine tailing ponds. ii) Synthesis of Fe ₃ O ₄ nanoparticles and functionalization with sulfide polymers for selective adsorption of Cu ²⁺ ions iii) Fabrication of a fixed bed reactor grafted with functionalized nanocomposites for efficient recovery of Cu ²⁺ from low-grade ore tailings
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks novelty and concept is not clear. 2. No preliminary work has been carried out 3. Such type of project should carry industry support including part finance by them. 	

50	
Project No.	SNTMOM/892/2022
Project Title	Mineral industry waste processing for development of efficient adsorbents and extraction of residual metals Metal Extraction (Metallurgical processes)
Institution	Malaviya National Institute of Technology Jaipur
Principal Investigator	Madhu Agarwal (9549654166, magarwal.chem@mnit.ac.in)
Project Cost & Duration	57.0 Lakhs 3 Yrs
Objectives of the project	Development of efficient adsorbent for the removal of dye waste and emerging pollutants • Recovery of valuable metals from the waste of the mineral industry using novel solvent. • Immobilization of hazardous waste for better disposal.
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Proposal is very generic. 2. Industry partnership and co-funding is required. 3. POC should be first established at the level of 100g-1kg 	

51	
Project No.	SNTMOM/894/2022
Project Title	Recovery of Rhenium from Copper Concentration Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	LN INDTECH SERVICES PVT LTD
Principal Investigator	Subash Chandra Mallick (9922498715, lnindtech@gmail.com)
Project Cost & Duration	Rs. 3804200.00 2 yrs
Objectives of the project	The objective of the proposed project is to recycling of wastes of copper industries to produce some valuable materials which have wide applications and uses. To recover Rhenium material from copper Concentration . i. To recover purified Rhenium material from the copper concentrate . ii. To produce purified Molybdenum during the process iii. To optimize the process parameters for commercially viable extraction process technology
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project lacks proof of concept and no flowsheet of proposed process could be explained 2. The raw material is copper concentrate for smelting, containing minute 	

percentage of Rhenium
3. Rhenium recovery from wet copper concentrate is difficult
4. PI may get the support of an industry for such project.

52	
Project No.	SNTMOM/902/2022
Project Title	Extraction of Lithium Oxide from Partially Laterised Khondalite Rocks - a bauxite mining waste and its application in Lithium battery Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	SOCIETY RAMAN EDUCATION
Principal Investigator	Ranjita Swain (9556779520, ranjitaswain@cvrce.edu.in)
Project Cost & Duration	Rs. 5287660.00 3yrs
Objectives of the project	? PLK- a bauxite mining waste can be a potential resource for the production of valuable minerals. ? Extraction of Lithium oxide (LiO ₂) using different acids/alkalis. ? Optimisation of leaching reaction and its process parameters. ? Kinetic study on leaching reaction. ? Simulation using MATLAB/DOE. ? Lithium Oxide extracted in liquor. ? The residue part can be utilised after a suitable treatment. ? This is a zero waste technology. ? Waste to wealth.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. PI has not presented proper analysis of raw material. 2. After preliminary studies, PI may approach NALCO for support and raw material 3. PI can co-ordinate with MECL / JNARDDC w.r.t detail characterization of PLK rocks already done by them. 4. It is essential to get the analysis verified with number of samples collected in a scientific manner to conclude presence of Li. 	

53	
Project No.	SNTMOM/910/2022
Project Title	DEVELOPMENT OF A NOVEL LOW-COST AMBIENT RECONNAISSANCE TECHNIQUE FOR THE EXPLORATION OF MINERAL DEPOSITS Geosciences and Exploration
Institution	Indian Institute of Technology Madras
Principal Investigator	TarunNaskar (8861541569, tarunnaskar@civil.iitm.ac.in)
Project Cost	Rs. 4975200.00

& Duration	3yrs
Objectives of the project	The main objective of this proposed study is: 1) To develop a new passive low-frequency surface wave field test methodology. 2) To develop a new wave field transformation technique to generate high resolution images of the subsurface from a passive surface wave test. 3) To develop a fast and accurate numerical algorithm to model the subsurface earth. 4) To develop an analytical Jacobian based Inverse model 5) To develop a convolutional neural network-based algorithm to predict mineral deposit
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project is of theoretical nature rather than of practical use 2. Methodology of using sensors is not clear 3. Objectives are not clear and the proposed work is not suitable for mineral exploration. 	

54	
Project No.	SNTMOM/915/2022
Project Title	Integrated hairy root phytoremediation with biochar application for the in-situ transformation of mine tailings from Sukinda Valley Beneficiation, Ore Dressing, Mineral Processing & Recovery from waste
Institution	National Institute of Technology Rourkela
Principal Investigator	Balasubramanian P (8280282807, biobala@nitrkl.ac.in)
Project Cost & Duration	Rs. 3744600.00 3yrs
Objectives of the project	The proposed research work has been planned with the following specific objectives: 1. Production of hairy roots by infecting the selected plant species with <i>A. rhizogenes</i> through transformation. 2. Phytoremediation of chromite overburden by using hairy root cultures and biochar. 3. Application of paper-based electrochemical Biosensor for assessment of heavy metals in soil. 4. To elucidate the mechanism by hairy root cultures with biochar on abandoned overburden sites. 5. Demonstration of the developed treatment techniques with real-time reclamation of Sukinda Chromite valley (Odisha, India)
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Project does not have clarity as to what would happen to Cr+6 ultimately 2. No preliminary studies done 3. If there is rain the hexavalent chromium concentration at roots will spread 	

- thereby causing damage to living beings
4. Phytoremediation is done by others and yet to be proved for application in Cr+6

55	
Project No.	SNTMOM/928/2022
Project Title	Exploring the Rare Earth Elements from mines of Kachchh Gujarat Developing a prospective technology for REE extraction through Microbial Mobilization for industrial applications
Institution	GUJARAT INSTITUTE OF DESERT ECOLOGY
Principal Investigator	K KARTHIKEYAN (8141276926, karthikmicrobio@gmail.com)
Project Cost & Duration	24 Lakhs 3 years
Objectives of the project	The intended work-plan consists of a methodical investigation comprising the following: • Reconnaissance survey in the mines of Kachchh and conduct sampling at different types of mines and mine tailings (GUIDE and KSKVKU). • Characterizing the samples for mineralogical characteristics and quantification of REE's from the samples using ICP-AES, XRF and SEM (KSKVKU and Shree Ram Minerals). • To further study the microbial community structure via metagenome of mine soil and mine tailings (CSIR-NEERI). • To isolate Organic acid producing microbial strains (fungi) from the samples and their application in the extraction of REE's (GUIDE). • To evaluate the bioleaching and biosorption potential of the strains for REE's under varying bioprocess variables (GSFCU). • Further to develop Novel application of REE's for o In-vitro studies on Mammalian Cell culture for potential use of REEs in healthcare and diagnostic sector (GSFCU). o Photocatalytic treatment of wastewater employing REE's doped with Metal oxides (GUIDE and M/s Shree Ram Minerals). • To create a database on potential mines for exploration of rare earth elements from Kachchh (GUIDE and KSKVKU). • To understand the economic evaluation of the technology in bioleaching and its applications (All the participating Institutes).
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Proposal is Techno-economically not feasible. 2. No possibility for scalability. 3. Should perform prefeasibility studies in gpl or mgpl level REE solutions and establish the POC. 	

56	
Project No.	SNTMOM/930/2022
Project Title	Graphene based conducting ink for energy storage and microwave application

Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	mamatamohapatra (9437260688, mamata@immt.res.in)
Project Cost & Duration	57.45 Lakhs 2 Yrs
Objectives of the project	Synthesis of hybrid graphene conductive inks with use of metal particles and polymer materials • Investigation on different polymer host matrix assisted creation of graphene inks • Optimizing the liquid media assisted synthesise route to generate graphene inks with variable solvents • To develop a scalable, cost-effective and facile method for the preparation of flexible graphene ink substrates • Study of electrochemical properties of developed ink • Evaluation of Microwave properties of as-prepared graphene inks with various experimental conditions • Scale up the generation of graphene inks to bench scale • Testing of graphene ink based screen type radar absorbing material for Microwave anechoic Chamber or Testing of Graphene ink based resistive sheet design for wideband flat, thin absorbing screen towards microwave absorption • Cost analysis with process flow sheet development
REMARKS/SUGGESTION: NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. Proposal is not relevant to the purview of MOM. 2. PI may approach DRDO / MEITY 	

57	
Project No.	SNTMOM/946/2022
Project Title	Reclamation of abandoned mining sites using cattle dung derived biochar Mining (includes rock mechanics, design, equipments, energy, environment,safety)
Institution	Indian Institute of Technology Roorkee
Principal Investigator	Sonal K. Thengane 7977507193, sonalt@hre.iitr.ac.in
Project Cost & Duration	Duration: 3 Yrs, 0 Mth Cost 7190000
Objectives of the project	<p>The objective of this study is to find out the potential of biochar in the reclamation of abandoned mining sites in India. The main objectives of this integrated experimental and theoretical research are as follows:</p> <ul style="list-style-type: none"> • To produce biochar using slow pyrolysis of cattle dung using an auger reactor. • To evaluate the impact of biochar on soil samples collected from different abandoned mining sites in India and find the optimum

	<p>percentage for mixing</p> <ul style="list-style-type: none"> • To evaluate the effect of soil amended with cattle dung biochar on plant growth parameters and the yield • To evaluate the environmental and economic performance of the proposed intervention for selected abandoned mining sites as case studies.
REMARKS/SUGGESTION:	
NOT RECOMMENDED	
<ol style="list-style-type: none"> 1. The objective of the project is not aligning with the MoM goals and thrust areas 2. PI may explore other funding agency 	

7. REVIEW OF COMPLETED / ONGOING PROJECTS

The following projects were reviewed by the PERC and recommendations are as below:-

COMPLETED - 4 nos.

1	
Project No.	14/12/2017-Metal-IV
Project Title	Critical Mineral (non-fuel) Resources Index of India-for effective policy decisions on mineral and manufacturing sector of India
Institution	Council of Energy Environment and Water (CEEW), Thapar House, Janpath, New Delhi
Principal Investigator	Vaibhav Gupta vaibhav.gupta@ceew.in
Project Cost & Duration	Duration: 3 years Rs.36.29115 lakh
<p>Remarks</p> <p>COMPLETED</p> <ol style="list-style-type: none"> 1) The PI has left the organization. 2) The final findings presented by the Co-PI were reviewed and accepted. 3) PI was advised to include the latest available data in the updated/final report. 4) PI was advised to submit the utilization certificates and statement of expenditure 5) Based on the final findings the PERC recommended for acceptance of the final report and closure by SSAG. 	

2	
Project No.	14/26/2018-Met4
Project Title	Improving fracture resistance of rocks through adhesive bonding for underground mining application
Institution	India Institute of Technology (ISM) Dhanbad
Principal Investigator	Dr.Rashmi Ranjan Das : 08895556016
Project Cost & Duration	Rs. 14.73467 lakh
Remarks COMPLETED <ol style="list-style-type: none"> 1. PI informed that project has been completed and report is already submitted 2. The final findings were reviewed and report was accepted. 3. Based on request of the PI, the project is recommended for time extension upto July 2022 4. A one page write up on the outcome of this project along with the potential scope for commercialization should be submitted to Ministry of Mines 5. Recommended to release balance funds subject to submission of utilization certificates and statement of expenditure. 6. PERC recommended for acceptance of the final report and closure by SSAG. 	

3	
Project No.	F.No. 14/14/2019-Metal-IV
Project Title	Identification and Investigation of efficacy of potential biochemical molecules for extraction of gold and other noble metals from tailings and waste sources.
Institution	Indian Institute of Technology Madras
Principal Investigator	Prof. T. Pradeep pradeep@iitm.ac.in : 09445560767
Project Cost & Duration	Rs. 34.64 Lakh Duration : 2 Years
Remarks COMPLETED <ol style="list-style-type: none"> 1. The final report has been submitted by the PI 2. The findings presented by the PI were reviewed and accepted. 3. The work was highly appreciated. 4. A one page write up on the outcome of this project should be submitted to Ministry of Mines 5. Recommended to release balance funds subject to submission of utilization certificates and statement of expenditure. 	

6. PERC recommended for acceptance of the final report and closure by SSAG
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4	
Project No.	14/9/2019-Metal-IV
Project Title	Utilization of aluminium dross to achieve zero waste – A bench scale study
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre, Wadi, Nagpur and CSIR-National Environmental Engineering Research Institute, Nagpur,
Principal Investigator	Upendra Singh Principal Scientist, Bauxite Division E-mail:Upendra1970@gmail.com
Project Cost & Duration	Rs.74.34 Lakh Duration: 2 Years

PERC REMARKS/SUGGESTION:**COMPLETED**

1. The final findings were reviewed and final report was accepted.
2. A one-page write-up on the outcome of this project should be submitted to Ministry of Mines highlighting the process economics of the technology for possible commercialization.
3. Recommended to release balance funds subject to submission of utilization certificates and statement of expenditure.
4. PERC recommended for acceptance of the final report and closure by SSAG.

ONGOING – 35 nos.

1	
Project No.	Met4-14/9/2021
Project Title	Studying, modelling and evolving a new blasting technique for open cast mine excavations near the proximity of structures (beyond 50 m) using the structural response analysis and dynamic FEM
Institution	CSIR Central Institute of Mining and Fuel Research
Principal Investigator	ADITIYA RANA adityarana.nitjaipur@gmail.com 9694641232
Project Cost & Duration	Rs. 38.19 lakhs 3 years
Remarks ONGOING <ol style="list-style-type: none"> 1. The progress was satisfactory 2. PI was advised to conduct more blasts at the earliest for validation 3. Recommended to release balance fund /next installment subject to submission of utilization certificate and statement of expenditure 	

2	
Project No.	Met4-14/1/2021
Project Title	Recovery of copper from water bodies nearby copper mines using microbial electrochemical systems
Institution	Indian Institute of Technology ISM Dhanbad Industry Partner Hindustan Copper Limited
Principal Investigator	VIPIN KUMAR E-mail:- vipinmicro1@iitism.ac.in 9471191352
Project Cost & Duration	Rs. 25 Lakhs 18 month
PERC REMARKS/SUGGESTION: ONGOING <ol style="list-style-type: none"> 1) Progress was slow and recovery of copper % is not appreciated by members 2) Sampling for copper recovery need to be done more systematically. 3) The project is recommended for time extension upto Dec 2022 as per request of PI for completing the pending work. 	

3	
Project No.	Met4-14/24/2021
Project Title	Corrosion and wear resistant advanced coatings based on high entropy alloys for mining equipments
Institution	Indian Institute of Technology Delhi
Principal Investigator	JAYANT JAIN E-mail:- jayantj@iitd.ac.in 9582513867
Project Cost & Duration	24 Lakhs 2 Years
REMARKS/SUGGESTIONS:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress of work is satisfactory 2) PI has done one preliminary coating trails 3) Recommended to release balance fund /next installment subject to submission of utilization certificate and statement of expenditure 	

4	
Project No.	Met4-14/17/2021
Project Title	Design, analysis and development of Rheo gravity die cast Al-15Mg2Si-4.5Si composite based light weight Bucket links for Mining Excavators
Institution	CSIR Central Mechanical Engineering Research Institute
Principal Investigator	PROSENJIT DAS E-mail:- prosenjit@cmeri.res.in , 9531590074
Project Cost & Duration	Rs. 55 Lakhs 2 Years
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress of work till now was reviewed 2) Since there is a change of Institute of the PI, the project is recommended for time extension by one year 3) Director CMRI should release the equipment and consumables to the PIs current location 4) Recommended to release balance fund /next installment subject to submission of utilization certificate and statement of expenditure 	

5	
Project No.	Met4-14/2/2021
Project Title	Development of Empirical Methodology for Design of Crown Pillar during transition from opencast to underground mining for Indian Mines
Institution	CSIR Central Institute of Mining and Fuel Research
Principal Investigator	CHANDRANI PRASAD E-mail:- chandrani@cimfr.nic.in 9422477144
Project Cost & Duration	Duration 3 years Rs. 37.89850 lakhs
Remarks ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Panel suggested PI to carry out field visit and complete the project work. 3) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

6	
Project No.	Met4-14/18/2021
Project Title	Determination of optimum safe distance of toe of dump from crest of open pit for stability of pit slope under different geo-mining conditions
Institution	CSIR Central Institute of Mining and Fuel Research Industry Partner Hindustan Zinc Limited, Tata Steel and SAIL
Principal Investigator	SANJAY KUMAR ROY E-mail:- sanjaykroy.cmri@gmail.com 9471192140
Project Cost & Duration	Rs. 52 Lakhs 2 years
Remarks ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was appreciated. 3) PI was advised to procure the equipment at the earliest and validate data with case studies 4) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

7	
Project No.	Met4-14/3/2021
Project Title	Development of Ready-To-Use assorted sand for construction activities from Zinc Refining Wastes and Marbel Powder.(Phase 2
Institution	Manipal University Jaipur
Principal Investigator	Bhavna Tripathi bhavna.tripathi@jaipur.manipal.edu , 9460383678
Project Cost & Duration	Rs. 30 lakh
Remarks ONGOING <ol style="list-style-type: none"> 1. Progress was satisfactory 2. Proposed objectives are being duly met. 3. PI should work on cost calculations 4. Recommended to release next instalment/balance funds subject to submission of utilization certificates and statement of expenditure. 	

8	
Project No.	Met4-14/26/2021
Project Title	Preparation of synthetic zircon from zircon minerals of beach sand, its characterization and value addition as thermal and electrical insulator
Institution	C.V. Raman Global University, Bhubaneswar (NGO - Society Raman Education)
Principal Investigator	SUNITA ROUSTRAY E-mail:- sroustray1@cvrce.edu.in 7327847963
Project Cost & Duration	Rs. 10 Lakhs (seed money) Duration: 1 years
PERC REMARKS/SUGGESTION: ONGOING <ol style="list-style-type: none"> 1) Progress is satisfactory 2) Work is appreciated by the committee and scope of large-scale studies in collaboration with IREL is identified 3) Material balance showing in-flow and out-flow of material and recovery of zirconium should be incorporated in final findings. 	

9	
Project No.	Met4-14/19/2021
Project Title	Design, Synthesis and Fabrication of Donor-Acceptor Based Fluorescent Sensing Organic-Nanomaterials and Devices for Detection and Quantification of Rare Earth Elements in Minerals
Institution	University of Calcutta
Principal Investigator	DILIP KUMAR MAITI E-mail:- maitidk@yahoo.com 0798061767
Project Cost & Duration	Rs. 54.935 Lakhs 2 Yrs
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Demonstration of the sensing is to be done in 6 months 2) PI has to speed up the procurement of equipment. 3) The progress is behind schedule. 	

10	
Project No.	Met4-14/8/2021
Project Title	Extraction and isolation of Al, K, Li, Rb and Cs from Mica
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	BARSA DAS E-mail:- barsha.dash@gmail.com 9439018460
Project Cost & Duration	Rs. 9.975Lakhs 1 Year
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) PI has complied to the suggestions 3) Need to increase the GPL to get quantity of material at least 100 kg 4) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

11	
Project No.	Met4-14/7/2021
Project Title	Development of Process for Making High Pure Quartz or Silica and Metallic Silicon from Low Grade Naturally Occurring Quartz
Institution	CSIR Institute of Minerals and Materials Technology

Principal Investigator	ALOK TRIPATHY E-mail:- atripathy@immt.res.in 9437066723
Project Cost & Duration	Rs 15 lakh (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Purity of silica achieved is 99.9% and Silicon recovery achieved close to 95%. 2) Silicon could be prepared using the technology developed 3) The findings on silica and iron content based on floatation were presented. 4) PI was advised to close the project and submit his findings. 	

12	
Project No.	Met4-14/4/2021
Project Title	Employing metallurgical silicon to develop new class of silicon composites for structural applications
Institution	Indian Institute of Technology Bhubaneswar
Principal Investigator	SRIKANT GOLLAPUDI E-mail:- srikantg@iitbbs.ac.in 9566288703
Project Cost & Duration	Rs 37.997 Lakhs 2 years
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

13	
Project No.	Met4-14/16/2021
Project Title	Bioleaching of Lithium from minerals and low grade ores of Indian origin
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	NILOTPALA PRADHAN

	E-mail:- npradhan@immt.res.in 0943754083
Project Cost & Duration	Rs. 12.936 Lakhs (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory till date 2) Proposed objectives are being duly met. 3) Work done was appreciated and the project is recommended for time extension up to March 2023. 	

14	
Project No.	Met4-14/15/2021
Project Title	Production of high pure manganese metal organic frameworks (Mn-MOFs) and their derivatives from low grade manganese ores for supercapacitor applications
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	BANKIM CHANDRA TRIPATHY E-mail:- bankim@immt.res.in 7978521730
Project Cost & Duration	Rs. 10 lakhs (seed money) 1ys
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) PI should undertake mass balance and characterization work 3) The final report should be submitted by PI with above suggestions to close the project. 	

15	
Project No.	Met4-14/27/2021
Project Title	Development of Alternative flux Material from Red Mud for Steel

	Dephosphorization
Institution	CSIR Central Electrochemical Research Institute
Principal Investigator	ANAND BABU G E-mail:- anandbabu@cecri.res.in 9486339240
Project Cost & Duration	Rs. 10 lakhs (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) PI should undertake physical separation with hematite 3) PI should get characterization data from Aluminium Industry/JNARDDC on red mud. 	

16	
Project No.	Met4-14/5/2021
Project Title	Sustainable ion exchange resin-based technology for rare earth extraction
Institution	Indian Institute of Technology Madras
Principal Investigator	THALAPPIL PRADEEP E-mail:- pradeep@iitm.ac.in 9445560767
Project Cost & Duration	Rs. 52.51 lakhs 2 Yrs
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was appreciated by members 3) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

17	
Project No.	Met4-14/28/2021
Project Title	Bio-electrochemical reclamation of titanium and other rare earth metals

	from red mud waste using a modified microbial fuel cell approach
Institution	PSG Institute of Advanced Studies (NGO - PSG and Sons Charities)
Principal Investigator	R.SELVAKUMAR E-mail:- rsk@psgias.ac.in 9944920032
Project Cost & Duration	Rs. 9.99 lakhs (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) PI should come up with process flow sheet and mass balance along with percentage of yield with time and economics of the process. 3) Focus should be on recovery of titanium & other elements 	

18	
Project No.	Met4-14/29/2021
Project Title	Exploring the Practicability of Extracting Platinum and Palladium from the Mineral Beds of Sittampudi Village in Salem District of Tamil Nadu An Experimental and Molecular Dynamics Approach
Institution	National Institute of Technology Trichy
Principal Investigator	KARTHIK.V E-mail:- kartik@cimfr.nic.in 9589442278
Project Cost & Duration	Rs. 15 lakhs (seed money) 1 Year
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) PI yet to start hydro metallurgical operations 2) Progress is behind schedule 	

19	
Project No.	Met4-14/20/2021
Project Title	Development of perovskite based materials using inexpensive RE mixed oxides precursors derived from Indian beach sands for room temperature magnetic refrigeration applications

Institution	CSIR- Indian Institute of Chemical Technology
Principal Investigator	Vasundhara Mutta E-mail:- mvas@iict.res.in 9496445333
Project Cost & Duration	Rs. 51 lakh (MoM-31 lakh, CSIR- 20 lakh) 1 year
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Based on request of PI, the project is recommended for time extension upto March 2023 3) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure 	

20	
Project S No.	Met4-14/30/2021
Project Title	Recovery of galena, sphalerite from lead zinc tailings by integrated energy efficient ultrafine comminution and novel shear floc-flotation and its impact on downstream Paste fill
Institution	Indian Institute of Technology Hyderabad and CSIR Institute of Minerals and Materials Technology Industry Partner Hindustan Zinc Limited
Principal Investigator	NARSIMA MANGADODDY E-mail:- narasimha@che.iith.ac.in 9505754134
Project Cost & Duration	Rs. 25 lakhs (Rs. 10 Lakh (seed money)(MoM) + Rs. 15 lakhs (HZL)) 1 year
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory but recoveries are less as of now which needs to improve. 2) Proposed objectives were duly met. 3) PI was advised to prepare process flow sheet and mass balance chart and focus on unit operations involved. 	

21	
Project No.	Met4-14/31/2021

Project Title	Innovative approach to recover chromite value from low-grade chromite ore, fines and slimes by dry and wet beneficiation technique
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	PRASANTA KUMAR BASKEY E-mail:- pkbiskey@immt.res.in 9470393508
Project Cost & Duration	Rs. 10 Lakh (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
PI was absent due to COVID.	

22	
Project No.	Met4-14/32/2021
Project Title	Process development for the recovery of tungsten values from lean grade Indian resources
Institution	CSIR Institute of Minerals and Materials Technology
Principal Investigator	SHIV KUMAR ANGADI E-mail:- shivakumar@immt.res.in 8763866142
Project Cost & Duration	Rs. 10 Lakh (seed money) 1yr
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was in line with the proposal. 3) The project is recommended for time extension up to march 2023 as per request of PI 4) PI should come up with flow chart of the process 	

23	
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Project No.	F No. 14/3/2017-Metal IV
Project Title	Development of a novel underground mining method for exploitation of Chromite deposits from friable ore body and host rocks of Sukinda Valley, Odisha,
Institution	Department of Mining Engineering, IIT, Kharagpur
Principal Investigator	akverma@mining.iitkgp.ac.in : 09547859609
Project Cost & Duration	Duration: 3 years, Rs. 68.46 lakh
Remarks ONGOING <ol style="list-style-type: none"> 1) Project is delayed. 2) PI was suggested to develop the mining method which is the main activity of project 3) The project is recommended for time extension upto March 2023 as requested by the PI 	

24	
Project No.	14/8/2018-Met4
Project Title	Use of Overburden Clay as alternate for aggregate
Institution	Indian Institute of Technology Madras Chennai-600 036, India & Neyveli Lignite Corporation Ltd. (NLC Ltd)
Principal Investigator	Dr. K. Ramamurthy, E-mail:-vivek@iitm.ac.in: 09445391265
Project Cost & Duration	Rs. 173 Lakhs (MoM's contribution-Rs. 70 lakhs & NLC's contribution - Rs.103 lakh) 3 years
PERC REMARKS/SUGGESTION: ONGOING <ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was satisfactory and in line with the objectives. 3) The project is recommended for time extension up to Dec 2022 as per PI request 4) Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure 	

25	
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Project No.	14/18/2018-Met4
Project Title	Investigation of the dynamics & mechanism of flocculation by polymers and biopolymers for separation of solid particles of high rate thickeners in mineral processing industries.
Institution	CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) Industrial Estate P.O, Thiruvananthapuram - 695 019
Principal Investigator	Dr. Lakshmi Rakesh Kumar Yasarla E-mail:yasarla.rakesh@gmail.com : 09032450550
Project Cost & Duration	Rs. 42.61 lakhs 2 years
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was appreciated. 3) the project is recommended for time extension up to Dec 2022 as per PI request 4) Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure 	

26	
Project No.	14/23/2018-Met4
Project Title	Bench scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA)
Institution	JNARDDC, Nagpur
Principal Investigator	Shri Manoj T. Nimje E-mail:mantukni@gmail.com
Project Cost & Duration	Rs.63.026 lakh 18 Month
Objectives of the project	Based on in-house laboratory scale (10 g CFA) studies, it is confirmed that extraction of pure silica and aluminium fluoride from coal fly ash is technically possible. Major objective of the project is to study process on bench scale (0.5-1 kg CFA) and to understand various parameters of process, such as Pressure, Temperature
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was appreciated. 3) The project is recommended for time extension up to Dec 2022 as per PI request 	

for submission of final report
4) Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure

27	
Project No.	14/27/2018-Met4
Project Title	Integrated Geological, Geochemical and Geophysical studies for the delineation of Chromitite extensions in Nuggihalli Schist Belt and implications for Ni-Cu+-PGE mineralization.
Institution	CSIR-NATIONAL GEOPHYSICAL RESEARCH INSTITUTE and Indian Institute of Science, Bangalore
Principal Investigator	Dr P.V. Sunder Raju; Principal Scientist Email: perumala.raju@gmail.com; : 09490748152 Dr Sajeev Krishnan Associate Professor Centre for Earth Sciences (CEaS), Indian Institute of Science, Bangalore 560 012, India E-mail: sajeev@iisc.ac.in.krishnansajeev@gmail.com09448427463/8281309847
Project Cost & Duration	Rs. 60.00 lakh (NGRI- Rs.30 lakh, IISc-Rs. 30 lakh, 2 years

PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) A summary table of all elements present with weight percentage range along with minerals associated to be provided for better understanding. 3) The project is recommended for time extension up to Oct 2022 for submission of final project report. 4) Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure 	

28	
Project No.	14/28/2018-Met4
Project Title	Development of graphene based membranes from graphite ore for desalination.
Institution	CSIR -National Institute for Interdisciplinary Science and Technology
Principal Investigator	Dr SreejaKumari S.S. E-mail:-sreejakumari@niist.res.in: 09442217259
Project Cost & Duration	Rs 60 Lakhs 2 Yrs,

REMARKS/SUGGESTION:**ONGOING**

- 1) Progress was satisfactory.
- 2) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure

29	
Project No.	14/30/2018-Met4
Project Title	Treatment of Acid Mine Drainage for Heavy Metal Removal,
Institution	Indian Institute of Technology Mandi, Kamand Campus, VPO Kamand,
Principal Investigator	Dr.SumitSinha Ray \ E-mail:-sumitsinha@iitmandi.ac.in : 09748159620
Project Cost & Duration	Rs. 19.8397 Lakh 1 years
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) PI and Co-PI both have left the institute. 2) No person was authorized to present the status of the project. 3) Ministry is requested to take up the matter with Director, IIT Mandi to get the final report 	

30	
Project No.	14/31/2018-Met4
Project Title	Recovery of scandium metal from acid leach liquor from titanium mineral industries.
Institution	CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) Industrial Estate P.O, Thiruvananthapuram -695
Principal Investigator	Dr. M. Sundararajan E-mail:rajanmsundar77@yahoo.com : 08129075511
Project Cost & Duration	Rs. 32.92 lakh 2 years
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory and well presented. 2) The project is recommended for time extension up to March 2023 	

3)	Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure
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31	
Project No.	14/6/2019-Metal-IV
Project Title	Processing of spent and natural graphite for energy and aerospace application.
Institution	CSIR-Institute of Minerals & Materials Technology (Formerly Regional Research Laboratory), Bhubaneswar PIN: 751013
Principal Investigator	Mamata Mohapatra (Sr. Scientist) CSIR-IMMT, Mail- mamata@immt.res.in: 09437260688
Project Cost & Duration	Rs. 23.10 Lakh Duration:2 Years
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) Work done was as per the objectives. 3) The project is recommended for time extension up to April 2023 4) PI should present the performance of battery and after validation give a comparison with other similar device with regard to cost and performance. 5) Recommended to release next instalment / balance funds subject to submission of utilization certificates and statement of expenditure 	

32	
Project No.	14/7/2019-Metal-IV
Project Title	Production and certification of certified reference materials (CRMs) for the analysis of aluminium alloy.
Institution	Jawaharlal Nehru Aluminium Research Development and Design Centre
Principal Investigator	R. N. Chouhan, Principal Scientist Emailid: rnchouhan@jnarddc.gov.in: 09422124941
Project Cost & Duration	Rs 76.40 Lakhs 2 Yrs,
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress was satisfactory. 2) PI presented the status of CRMs developed by the Lab 	

- 3) Recommended to release next installment / balance funds subject to submission of utilization certificates and statement of expenditure

33	
Project No.	14/12/2019-Metal-IV
Project Title	Development of Novel Nano porous hollow Fiber membrane based unit for the effective treatment of Mine wastewater
Institution	National Institute of Technology Karnataka, Surathkal
Principal Investigator	Prof. ArunM.Isloor Membrane Technology Laboratory, Prof & Head of Department, Department of Chemistry, National Institute of Technology Karnataka, Surathkal, Mangalore E-mail: isloor@yahoo.com: 09448523990
Project Cost & Duration	Rs 5 lakh (seed money), 18 months
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress of work carried out with seed money is satisfactory 2) After submission of the final report of this initial work, the PI should rework the original proposal 3) PI should concentrate on filtration and absorption and interact with NFDTC for reclaiming process waste water 	

34	
Project No.	14/13/2019-Metal-IV
Project Title	Direct production of Fe-Cr- Ni-Mn stainless alloy from mine waste by thermal plasma process
Institution	CSIR-Institute of Minerals & Materials Technology Bhubaneswar
Principal Investigator	Dr.A.K.Chaubey Principal Scientist E-mail: akchaubey@immt.res.in 094380890232 anil.immt@gmail.com
Project Cost & Duration	Rs 38.31 Lakhs 2 Yrs,
REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) Progress is behind the schedule 2) PI needs to accelerate the work to complete before Dec 2022 	

35	
Project S No.	14/11/2019-Metal-IV
Project Title	Mineral chemistry, isotope geochemistry, geochronology, and metallogeny of rare and rare-earth metals present in the alkaline-carbonatite complexes associated to the Narmada-Son rift zone, western India
Institution	Banaras Hindu University, Varanasi
Principal Investigator	Dr.Amiya Kumar Samal; Department of Geology, Institute of Science E-mail: amiyasamal007@gmail.com: 9580270209
Project Cost & Duration	Rs. 14.99 Lakh Duration: 9 months (1 st Phase)
PERC REMARKS/SUGGESTION:	
ONGOING	
<ol style="list-style-type: none"> 1) PI should undertake characterization, quantitative analysis & chemical analysis and present the data in table form. 2) Associated minerals may also be summarized for different elements in the final report. 3) The project is recommended for time extension up to March 2023 	

8) The members suggested to hold a brainstorming session of PERC with a view to review the existing guidelines, thrust areas for making the S&T (Mines) scheme more effective.

9) PERC suggested that the Ministry should pay suitable honorarium to non-official members for the meeting.

The PERC meeting concluded with thanks to the chair, members and the experts.

ANNEXURE-A

**LIST OF PARTICIPANTS OF 22nd PERC MEETING HELD THROUGH VC
DURING 03-05 August 2022**

Sr no	Name	Portfolio
1.	Shri U C Joshi Joint Secretary (Mines), Delhi	Chairman
2.	Dr. Pradeep Singh Director Technical (Mines), Delhi	Member
3.	Shri A. R. Sengupta Dy Secretary, IFD (Mines), Delhi	Member
4.	Shri Dheeraj Kumar Dy Secretary (Mines), Delhi	Member
5.	Prof. T.C. Rao Ex. Director, RRL Bhopal	Member
6.	Prof S.P. Mehrotra IIT, Gandhinagar	Member
7.	Shri B.K. Satpathy Ex E.D, NALCO, Bhubaneswar	Member
8.	Dr. K. Balasubramanian Director, NFTDC Hyderabad	Member
9.	Dr. A. Agnihotri Director, JNARDDC	Member
10.	Prof. Suddhasawa Basu, Director, CSIR-IMMT	Member
11.	Dr. H.S. Venkatesh Director, NIRM, Bangalore	Member
12.	Shri Subrata Kar GM (R&D), NALCO, Bhubaneswar	Representative Member
13.	Prof. A K Mishra Head, Department of Mining Engineering, IIT (ISM), Dhanbad	Representative Member
14.	Dr P K Mandal, Chief Scientist & Head, Mining Methods & Geomechanics Group, CIMFR, Dhanbad	Representative Member
15.	Shri Sanjay Panjiyar Director (Operations) HCL, Kolkata	Member
16.	Shri Pradeep Kulkarni, Dy General Manager (Exploration), MECL, Nagpur	Representative Member
17.	Dr P C Jha Head (Engineering Geophysics) NIRM Bangalore	Representative Member
18.	Shri Sarang Dhattrak Scientist-D, NIOH, Ahmedabad	Representative Member

Leave of absence granted to other members.