Team CSIR

PARTICIPATING LABORATORIES

	**Advanced Materials and Processes Research Institute (AMPRI)** Formerly Regional Research Laboratory Hoshangabad Road, Bhopal 462026, M.P., India Phone: +91-755-2457105; Fax: 2457042 e-mail: info@ampri.res.in Website: www. ampri.res.in
	**Central Building Research Institute (CBRI)** CBRI, Roorkee - 247 667, Uttrakhand, India Phone: +91-1332-283200; Fax: 272272 e-mail: director@cbrimail.com Website : www.cbri.res.in, www.cbri.org.in
	**Central Glass and Ceramic Research Institute (CGCRI)** 196 Raja S C Mullick Road, Kolkata-700032, WB, India Phone : +91-33-2473-5829 / 24839241; Fax : 24730957 Email : director@cgcri.res.in; imanna@cgcri.res.in Website: www.cgcri.res.in
	**Central Institute of Mining and Fuel Research (CIMFR)** Barwa Road, Dhanbad - 826 015, Jharkhand, India Phone: +91-326-2296023/2296006; Fax: 2296025 E-mail: dcmrips@yahoo.co.in director.cimfr@nic.in Website: www.cmriindia.nic.in
	**Central Mechanical Engineering Research Institute (CMERI)** Mahatma Gandhi Avenue, Durgapur – 713209, West Bengal, India Phone: : (0343) 62546749, 6510702, 6510327; Fax : 2548204 E-mail : director@cmeri.res.in, bdg@cmeri.res.in Website : www.cmeri.res.in
	**Institute of Minerals and Materials Technology (IMMT)** Formerly Regional Research Laboratory Bhubaneswar - 751 013, Orissa, India Phone : +91-674-2581126; Fax: 2581160 Email: bkm@immt.res.in / dir@immt.res.in Website : www.immt.res.in
	**North East Institute of Science and Technology (NEIST)** Formerly Regional Research Laboratory Jorhat-785 006, Assam, India Phone :+91-376-2370121/2370086; Fax : 2370011 E-mail :drrljt@csir.res.in; director@rrljorhat.res.in Website:www.rrljorhat.res.in
	**National Institute for Interdisciplinary Science and Technology** (NIIST) Formerly Regional Research Laboratory Thiruvananthapuram – 695 019, Kerala, India Phone. : +91-471–2515220 / 2490674; Fax : 2491712 / 2491585 Email :sureshdas@niist.res.in Website: www.niist.res.in
	**National Metallurgical Laboratory (NML)** Burmamines, Jamshedpur-831007, India Phone: +91-657-2345000-001, 2345028; Fax: 2345213, 2345153 E-Mail: director@nmlindia.org Website : www.nmlindia.org
	**National Physical Laboratory (NPL)** Dr. K.S. Krishnan Marg New Delhi – 110012, India Phone: +91-11-45609212, 25742610; Fax: 45609310, 25726938 Email: root@nplindia.org or root@nplindia.ernet.in Website: www.nplindia.org

Team CSIR

Technologies & Expertise

CSIR Laboratories, working in the field of geological exploration and mining (Led by Central Institute of Mining & Fuel Research, CIMFR) are well equipped and have expertise to carry out planned R&D with state of art facilities for various aspects of mining.

CSIR also extends testing, evaluation, calibration and consultancy services for explosives and accessories, mine ventilation and safety equipment, roof supports, personnel protective equipment, flame proof and intrinsically safe equipment, electrical cables, mining and allied industrial components, wire ropes, cage and suspension gear components, aerial ropeway etc., for their safe use.

Birds eye view of Highwall mining site of MOCP (SCCL) and discussion with CSIR Scientists for implementation

A multi - disciplinary approach is being adopted by the CSIR to solve various problems in operative mines and enhance mines' safety and improve the productivity. Scientists with diversified background, such as geology, applied geology, instrumentation, environmental sciences, mechanical engineering, mining, mineral processing, computer applications etc., have been working in the R&D related to mining. CSIR has experience of several decades in coal mine geo mechanics, which coupled with the recent R&D on numerical modelling and simulation coupled with empirical approach have resulted in significant contribution in the mining areas such as: Highwall Mining operations, maximizing coal recovery and protection of surface and sub-surface properties.

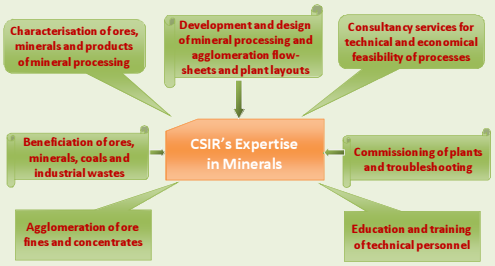
CSIR has developed various technologies pertaining to the exploration and mining areas. Some of the pertinent ones developed in the recent past are: (i) A micro-processor based multi-channel intrinsically safe real time environment monitoring system, (ii) Wireless information and safety system for underground mines, (iii) Tracking and monitoring system for open cast mines, (iv) Proximity warning device for heavy earth moving machinery, and (v) Design of Highwall Mining to recover locked up - coal in opencast mines.

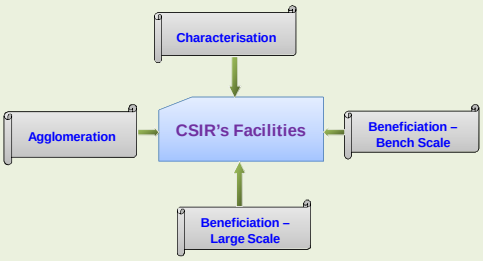
Technologies Commercialised

Technology / Process / Product / Software	Party
A microprocessor based multi-channel intrinsically safe real-time environmental monitoring system	Environmental Division of M/S. Jagdamba Retreading co., Gandhi Nagar, Dhanbad – 826 001
Wireless Information and Safety System for Underground Mines (Indian &International Patent granted)	M/s. Safe Instruments # 67, Phase – 3B1, Mohali- 160059,
Tracking and Monitoring System for Opencast Mines (Indian &International Patent granted)	M/s. Safe Instruments # 67, Phase – 3B1, Mohali- 160059,
Proximity Warning System for Heavy Earth Moving Machinery	M/s. Safe Instruments # 67, Phase – 3B1, Mohali- 160059,
Design of Highwall Mining to recover locked-up coal in Opencast Mines	1. Ramagundem Opencast Project-II of M/s Singareni Collieries Company Ltd. 2. Medapalli Opencast Project of M/s Singareni Collieries Company Ltd. (SCCL) 3. Quarry (SEB and AB), of M/s Tata Steel Ltd (TSL)
Improved Angethees/Chullahas	This technology was propagated in rural areas free of cost. Many Angethees /Chullahs were distributed in poor people. This was done in many villages of Dhanbad with the help of Dhanbad administration
Mini Coal Washery	1.M/s. Arun Coke Pvt. Ltd., , Kumardhubi, Dhanbad 2.M/s. Tetulia Coke Pvt. Ltd., Govindpur, Dhanbad M/s. Jai Maa Kali Udyog Ltd., Joraphatak, Dhanbad
Suitable formulation for dragline emulsion explosive suitable for shovel deep hole blasting	Keltech Energies Ltd., : Vishwanagar, Karkala taluk, Udupi -574104 (Karnataka)
Fragalyst, 3.0 Software	M/s. Wavelet Group, Unit No.10, Plot No. 59, Amchi Colony, Survey No. 1, Bawdhan, Pune- 411 021
Power Ring and Power Cord System	Orica Mining Services, Indian Explosives Limited, P.O: Indian Explosives (Gomia), Bokaro, - 829 112

MINERALS

CSIR Labs working in the field of Minerals are well equipped to carry out planned R&D with state of the art facilities for characterisation, laboratory and pilot scale beneficiation and agglomeration studies on various types of ores, minerals and industrial wastes. Since their establishment, the concerned laboratories were involved in exhaustive batch and pilot plant investigations on various ores and minerals from all over the country and abroad. So far, more than 2000 investigations have been successfully completed. Based on the know-how developed at the various laboratories of CSIR, several commercial plants have been commissioned in the country to process various ores and minerals. Processes have been developed at various CSIR laboratories for setting up the commercial sinter plants as well as for the improvement in the existing sintering processes, so as to produce quality sinter from iron ore fines and concentrates at reasonable cost





A multi-disciplinary approach is essential to solve the mineral processing problems. A group of Scientists and Engineers, educated at premier institutions of the country and some with specialized training abroad, are presently working in different areas of mineral processing and agglomeration.

MINERAL PROCESSING FACILITIES AND EXPERTISE IN CSIR
(State of Development)

Minerals	CIMFR Dhanbad			NML Jamshedpur			IMT Bhubaneswar			AMPRI Bhopal			IIM Jammu			NEIST Jorhat			NIIST Trivandrum		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Ferrous Minerals																					
Iron ore	○	○	○	●	●	●	●	○	○	●	○	○	○	○	○	●	●	●	○	○	○
Manganese ore	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Chromite ore	○	○	○	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Nickel & Cobalt Ores	○	○	○	●	●	○	●	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Magnetitle	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	●	○	○	○	○	○
Non-ferrous & Refractory Minerals																					
Copper ore	○	○	○	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Lead / Zinc ore	○	○	○	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Aluminium ore	○	○	○	●	○	○	●	○	○	●	○	○	●	●	●	●	○	○	○	○	○
Coal	●	●	●	●	●	●	●	●	○	●	○	○	○	○	○	●	●	○	○	○	○
Non-Metallic & Refractory Minerals																					
Lime stone	○	○	○	●	●	○	●	○	○	●	○	○	●	○	○	●	○	○	○	○	○
Magnesite	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	●	○	○	○	○	○
Dolomite	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Flourspar	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Kyanite	○	○	○	●	●	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Sillimnite	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	●	○	○	○	○	○
Quartz & silica sand	○	○	○	●	○	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Graphite	○	○	○	●	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Clay and bentonite	○	○	○	●	○	○	●	○	○	●	○	○	●	○	○	●	○	○	●	●	●
Barite	○	○	○	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Strategic & precious Minerals																					
Tungsten ore	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Tin ore	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Gold / Silver ore	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○
Molybdenite	○	○	○	●	○	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Rutile	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	●	○	○
Ilemenite	○	○	○	○	○	○	●	●	●	○	○	○	○	○	○	○	○	○	●	●	●
Fertiliser Minerals																					
Rock phosphate	○	○	○	●	●	○	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○
Gypsum	○	○	○	○	○	○	○	○	○	○	○	○	●	●	○	○	○	○	○	○	○
Pyrite / Pyrrhottle	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○

A = Laboratory Scale, B = Pilot Scale, C = Industry Level, ● = Developed, ○ = Not developed

Team CSIR

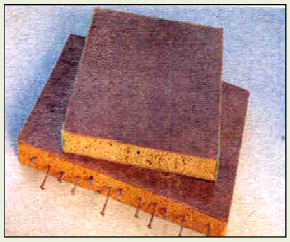
Service to the Nation

MATERIALS

Team CSIR

A number of CSIR Laboratories are working in various field of Materials Science. The activities can be grouped into areas like — Structural Materials, Industrials Materials, Functional Materials, Automotive Materials, Metals & Alloys, and Waste Materials and so on. The laboratories having major programmes in the area of materials are given below:

AMPRI, Bhopal	Metallic and polymer composites, casting and forming, Auto components
CBRI, Roorkee	Building materials, Agro-industrial waste + polymer composites, wood substitutes, protective coatings etc.
CGCRI, Kolkata	Glass & Ceramics, Energy storage materials, optical fibre, composite materials, biomedical implant and coating technology.
CMERI, Durgapur	Foundry, casting, rapid prototyping, wear resistant & bio-compatible materials and IPMC actuators technology
IMMT, Bhubaneswar	Advanced materials, agro processing materials
NAL, Bangalore	Aerospace materials, smart materials, composite materials, design and fabrication of components
NCL, Pune	Catalyst, nano-materials, polymer
NEIST, Jorhat	Oil field Materials, Building Materials
NIIST, Thiruvananthapuram	Light metals alloys and composites, agro processing
NML, Jamshedpur	Metals and alloys, composites, nano-structured materials biomaterials, super hard materials, magnetic materials
NPL, New Delhi	Metals and alloys, super hard materials, polymer and soft materials, liquid crystals superconducting materials



Service to the Nation