

**NATIONAL METALLURGICAL LABORATORY**  
**JAMSHEDPUR- 831 007, INDIA**

**Technical Reports\***

<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
1	Refining of Ferro-Silicon	Exploratory	1987
2	Development of appropriate technology for rural brass bell metal (BBM) artisans	Exploratory	1987
3	Development of tabular alumina	Exploratory	1987
4	Cleaner steel from the fines of ore and non-coking coal through DRIER-ESR	Exploratory	1987
5	Cold bonded pellets from Southern Iron ores and lignite char	Exploratory	1987
6	Optimisation of process parameters for Al-Mn powder by water atomisation	Exploratory	1987
7	Silica sand quality improvement programme for foundries	Exploratory	1987
8	Development of bench scale cone precipitator	Exploratory	1987
9	Studies on properties of Al-transition metal alloys	Exploratory	1987
10	Development of alumina graphite refractories	Exploratory	1987
11	Construction of predominance area diagram in personal computer	Exploratory	1987
12	Beneficiation and purification of tungsten ores of India	Exploratory	1987
13	Sponge fines based electrolytic iron powder for high density P/M parts	Exploratory	1987
14	Software on automatic mesh generator for 2-D elements in FEM	Exploratory	1987
15	<i>In-situ</i> metallographic examination of gas pipe-line for Oil India Ltd., Duliajan	Sponsored**	1987
16	Pilot plant studies on manganese ore supplied by MOIL for MECON	Sponsored**	1987
17	Investigation on LPG storage horton sphere plates	Sponsored**	1987
18	Electro-chemical evaluation of Al- based sacrificial anode for cathodic protection for Romalium Ind., Bombay	Sponsored**	1987
19	Studies on localised corrosion on steel weldment in Chloride media	Exploratory	1988
20	Corrosion behaviour of 430 and 304 Type Stainless Steels	Exploratory	1988
21	Influence of thermal cyclining on oxidation and oxide spallation of Fe-Cr-Al-X alloys (X=2y, Z)	Exploratory	1988
22	Study of wire drawing characteristics of cadmium	Exploratory	1988
23	Rapid solidification processing of white cast iron	Exploratory	1988

\*\*Confidential (Not for sale)

\* Available and the prices vary from report to report

<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
24	Development of Fe-Al intermetallics for high temperature applications	Exploratory	1988
25	Production of high quality steel using resiness process	Exploratory	1988
26	Ion electroforming	Exploratory	1988
27	Studies on sintering and grain growth of alumina	Exploratory	1988
28	Processing of ultra high carbon steel for plasticity	Exploratory	1988
29	Low silver brazing filler alloys for electronic use	Exploratory	1988
30	Characterisation and super concentration of magnetic and blue dust	Exploratory	1988
31	Development of dual phase steels influence of Sn/B	Exploratory	1988
32	Kinetics and mechanism of consolidation, swelling and sintering of DRI fines	Exploratory	1988
33	Heat transfer modelling in continuous casting	Exploratory	1988
34	Production of Ni and Co from the overburden of Chromite mines	Exploratory	1988
35	Effect of rapid solidification processing on the properties of high strength aluminium alloys (7075 Type)	Exploratory	1988
36	Technology for the production of cellular refractory products	Exploratory	1988
37	Evaluation of light and medium duty contact materials	Exploratory	1988
38	Elastic plastic crack tip analysis using finite element method	Exploratory	1988
39	Development of weldable rail steel with higher wear & fatigue resistance	Sponsored**	1988
40	Development of superior quality zinc alloys	Sponsored**	1988
41	Electro-chemical evaluation of Al-based sacrificial anode for cathodic protection for BHEL, Bhopal	Sponsored**	1988
42	Metallurgical analysis and mechanical tests for carbon Mo furnace tube for IOC, Digboi	Sponsored**	1988
43	Production of Low S Low P Iron through VRDR-SAF Route with SAIL	Collaborative	1989
44	Prevention of Sticking of Sheets during Pack Rolling for TCIL	Collaborative	1989
45	Development of computer software for Analytical Chemists	Exploratory	1989
46	Sensitivity studies of oxidation states by AAS	Exploratory	1989
47	Production of high purity graphite from graphite ore of Sivaganga, Tamilnadu by mineral dressing/chemical leaching methods	Exploratory	1989
48	Development of quicker and more reliable methods for the evaluation of residual life of boiler tube in thermal power plant	Exploratory	1989
49	Corrosion resistance of nickel phosphorus alloy deposits	Exploratory	1989
50	Development of iron copper composite powder for making P/M components	Exploratory	1989

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51	Development of rapidly solidified low silver brazing filler alloy	Exploratory	1989
52	Operational diagram for sulphide roasting	Exploratory	1989
53	Process modelling of electro-magnetic phenomena in the Hall-Herault Cell for aluminium smelting	Exploratory	1989
54	Studies on the characteristics of high aluminium cast iron	Exploratory	1989
55	Development of an improved inhibitor for steel pickling	Exploratory	1989
56	Leaching of cobalt bearing goethites in sulphurous kinetics and mechanisms	Exploratory	1989
57	Mathematical simulation of heat transfer in DRIR configuration of RESINESS process	Exploratory	1989
58	Development of passivator for galvanized surface	Exploratory	1989
59	Corrosion resistance of nickel phosphorus alloy deposits	Exploratory	1989
60	Development of an user friendly computer software for creep rupture data analysis	Exploratory	1989
61	Development of a software package for optimisation of Indian BF performance based on RIST model	Exploratory	1989
62	Evaluation of ternary phase diagrams	Exploratory	1989
63	Hydrogen embrittlement studies of 4340 & 17-4 pII steel using acoustic emission technique (AET)	Exploratory	1989
64	Fe-Mn-Al alloys for soft magnetic applications	Exploratory	1989
65	Influence of microstructures on creep behaviour of 2.25 Cr 1 Mo steel	Exploratory	1989
66	Recovery of gold from the dross generated during the refining of gold	Exploratory	1989
67	Development of super plastic cast iron through powder route	Exploratory	1989
68	Improvement in workability and ductility of Fe <sub>3</sub> Al based alloys	Exploratory	1989
69	A rapid complexometric scheme for the analysis of Ca & Mg in slags	Exploratory	1989
70	Rapid solidification processing of aluminium alloys for high temperature applications	Exploratory	1989
71	Study of inter-elemental interferences of polymetallic sea-bed nodules by AAS and ICP	Exploratory	1989
72	A new approach for studies on active-passive transition	Exploratory	1989
73	Specimen width effect on FCGR vis-vis crack closure	Exploratory	1989
74	Studies on electrochemical behaviour of steel in non-aqueous system (NAS)	Exploratory	1989
75	Production of non-ferrous metal powders with use of organic reagents/solvent	Exploratory	1989
76	Development of a process for production of high alumina (70-90%) cement to be used for low cement castable	Exploratory	1989

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
77	Production of chemical manganese dioxide from manganese ore	Exploratory	1989
78	Reduction of Cu-content in dump slag for ICC Ghatsila	Exploratory	1989
79	Protection of process equipment in the production of edible oil from rice bran using inhibitor	Exploratory	1989
80	Development of inhibitor acid for oil gas well acidisation	Sponsored**	1989
81	Evolution of emission standards for foundry Industry	Sponsored**	1989
82	Pilot plant studies on production of EMD using Mn Ore supplied by MMCL, Hyderabad	Sponsored**	1989
83	Bench scale flotation studies on graphite and magnetite samples from Bishrampur for BSMDC, Ranchi	Sponsored**	1989
84	Pilot plant studies for lowering of silica content in limestone of Gola for Dept. of Mines & Geology, Patna	Sponsored**	1989
85	Flotation studies on oxidised copper ore for HCL, Malanjkhand	Sponsored**	1989
86	Dry beneficiation of limestone from UP State Cement for UP State Cement Corpn.	Sponsored**	1989
87	Development of a corrosion Inhibitor (METASAVE) for multipurpose application with TATA Steel	Collaborative	1989
88	Production of High Purity Iron Powder from Sponge Fines with TATA Steel	Collaborative	1989
89	Entity model of metallic solutions	Exploratory	1990
90	Protection of aluminium alloys from exfoliation corrosion	Exploratory	1990
91	Use of conventional hydrocyclones to improve kyanite recovery	Exploratory	1990
92	Effect of collector variation and dosage on reduction of ash from a non-coking coal from Raniganj coal fields	Exploratory	1990
93	Effect of size reduction of liberation of coking coal to maximise the yield of clean coal	Exploratory	1990
94	Characterisation and leaching studies on nickel and copper bearing oxyhydroxides of tetravalent manganese	Exploratory	1990
95	Mathematical modelling studies in continuous casting with Tata Steel	Collaborative	1990
96	Corrosion investigation of Haldia Mourigram petroleum products pipeline for IOC, New Delhi	Sponsored**	1990
97	Studies on magnetite sample from Dublahera for Dept. of Mines & geology, Patna	Sponsored**	1990
98	Evaluation of residual life of main steam pipeline of boiler 4, 9A and 9B for NLC, Tamil Nadu	Sponsored**	1990
99	Failure analysis of boiler water wall tube and economiser tube for IOC, Barauni	Sponsored**	1990
100	Stress rupture study on the following steel grades i) GS 22 Mo ii) GS 17 Mo V5 11 for HEC	Sponsored**	1990

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
101	To conduct tensile and creep rupture test under specified test condition a) Accelerated stress rupture test (b) Hot tensile tests (c) report for BPCL/IEL	Sponsored**	1990
102	Melting trials of sponge fines in submerged arc furnace	Sponsored**	1990
103	Production of low P & S pig iron through VRDR-SAF route	Sponsored**	1990
104	Remaining life assessment of process heater tubes for IOC, Faridabad	Sponsored**	1990
105	Production of improved ingot moulds blast furnace liquid metal with Tata Steel	Collaborative	1990
106	Development of Tabular Alumina with Tata Steel	Collaborative	1990
107	Beneficiation of low grade kyanite ores to produce grade 1 & 2 kyanite, and production of high alumina refractories with Tata Steel	Collaborative	1990
108	Development of high chromium ferritic steel with SAIL	Collaborative	1990
109	Prevention of Rust on Imported Coils while in Transit with TCIL	Collaborative	1990
110	Production of SG Iron using elemental magnesium Treatment with TAYO	Collaborative	1990
111	Use of conventional hydro-cyclones for improved kyanite recovery	Exploratory	1991
112	Effect of size reduction on liberation of coking coal to maximise the yield of clean coal	Exploratory	1991
113	Characterisation and leaching studies on nickel and copper bearing oxyhydroxides of tetravalent manganese	Exploratory	1991
114	Micro and sub-micro determination of boron in metallurgical samples	Exploratory	1991
115	Simultaneous multicomponents analysis of copper cobalt and nickel in iron and manganese matrix	Exploratory	1991
116	Development of a computer software for fatigue life	Exploratory	1991
117	Development of sintered magnetic anode for cathodic protection	Exploratory	1991
118	Development of a charge calculation model of BOF steel making process	Exploratory	1991
119	Recovery of a valuable metal from complex sulphide ore by electrochlorination method	Exploratory	1991
120	Extraction of refractory gold and silver from the copper concentrates of Hutti gold mines	Exploratory	1991
121	Modelling of atmospheric corrosion	Exploratory	1991
122	Process modelling of electromagnetic phenomena in a multi-anode aluminium smelting cell	Exploratory	1991
123	Effect of annealing on the magnetic and structural properties of amorphous $Fe_{40}Ni_{40}B_{20}$	Exploratory	1991



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124	Effect of rapid solidification on the structure and properties of MG-Base alloys	Exploratory	1991
125	Development of high nitrogen extra low C stainless steel	Exploratory	1991
126	Removal & recovery of trace elements from industrial effluents	Exploratory	1991
127	Superplastic diffusion bonding for producing ultra high carbon steel and mild steel/ SS lamination	Exploratory	1991
128	Development of CCT diagram for ultra low carbon steel through modelling	Exploratory	1991
129	Influence of lead and graphite on the thermal properties of Rheo-cast Al-Si alloys	Exploratory	1991
130	Chemical enrichment and separation of gold by polyurethane from (PUF)	Exploratory	1991
131	Thermochemical modelling of high temperature corrosion behaviour of engineering alloys	Exploratory	1991
132	Development of 80-90% alumina, wear resistant ceramics sintered at low temperature	Exploratory	1991
133	Development of high density low porosity high alumina/sintered mullite grains from beach sand siliminite	Exploratory	1991
134	Beneficiation studies on iron ore from Bolani for Durgapur Steel Plant- Modernization Project for SAIL, DSP	Sponsored**	1991
135	Fatigue properties evaluation of TINSTEN steel In welded and unwelded condition for TISCO	Sponsored**	1991
136	Preparation of comprehensive document on pollution control in lime kiln for CPCB	Sponsored**	1991
137	Evaluation of creep and stress rupture properties of zirconium 2.5% Nb alloy for BARC	Sponsored**	1991
138	Stress rupture study on steel grade GS 18 Cr Mo 910 HEC, Ranchi	Sponsored**	1991
139	Beneficiation studies on a low grade graphite samples from Sivaganga Engineers India Ltd., New Delhi	Sponsored**	1991
140	Reduction of iron ore in VRDR furnace for M/s. Sponge Iron India Ltd., Paloncha	Sponsored**	1991
141	Estimation of residual life on main steam pipe line of Boilers 3, 7A, 7B, 8A & 8B for Neyveli Lignite Corpn.	Sponsored**	1991
142	Preparation of comprehensive industry document on pollution control in lime kiln for Central Pollution Control Board, New Delhi	Sponsored**	1991
143.	Production of high purity iron oxide from electrolytic iron powder for high quality Mn-Zn Ferrite	Exploratory	1992
144	A novel route to produce rapidly solidified tubes/ sheets inside a slowly rotating die	Exploratory	1992

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
145	Study of near threshold fatigue crack growth in 17-4 pH stainless steel	Exploratory	1992
146	Change in morphology of carbide due to long term service exposure of Cr-Mo steels	Exploratory	1992
147	Dispersion cum-separation studies on tungsten ore (slimes) for enhanced recovery of tungsten values with better grade	Exploratory	1992
148	Molecular property correlation in normal alkanes (C1-28) and their isomers with geometric volume	Exploratory	1992
149	Production of low phosphorus and low sulphur through Vertical Retort Direct Reduction		
150	Submerged Arc Furnace (VRDR-SAF) Route	Thrust Area	1992
151	Development of Tabular Alumina for Tata Steel	Interactive	1992
152	Use of METASAVE Inhibitor	Interactive	1992
153	Physico-chemical evaluation of iron ore and coal sample for Baster Ispat Udyog	Sponsored**	1992
154	Melting behaviour of high carbon sponge iron briquettes in cupola for Steel Authority of India Ltd.	Sponsored**	1992
155	Residual life estimation of the heater tube of 1/4 Cr 1/2 Mo steel IPCL, Baroda	Sponsored**	1992
156	Studies of iron ore from Bolani mines for modernisation of Durgapur Steel Plant (SAIL)	Sponsored**	1992
157	CTOD and fracture property evaluation of TISCO-TISTEN steel for Tata Steel	Sponsored**	1992
158	Failure investigation of off-shore pipe line for ONGC	Sponsored**	1992
159	Reducibility character of iron ore sample for Bihar Sponge Iron	Sponsored**	1992
160	Consultancy services relating to flow-sheet finalisation and preparation of equipment details etc. for Graphite Project of Billy Engg. Enterprises (Madras Complex)	Consultancy**	1992
161	Development of a beneficiation process for production of high purity magnesite concentrate for Dalmia Magnesite Corpn, Salem (Madras Complex)	Consultancy**	1992
162	Advisory consultancy on Shivaganga Project for Tamil Nadu Minerals, Madras	Consultancy**	1992
163	Causticizing green liquor and reburning of lime sludge for Andhra Pradesh Paper Mills (Madras Complex)	Consultancy**	1992
164	Improvement of design of vertical shaft kiln for Central Pollution Control Board, New Delhi	Sponsored**	1992
165	The evaluation of ternary phase diagrams (pt.-II)	Exploratory	1992
166	Thermodynamics of the quaternary system Ca-Si- C-O and the physical chemistry of simultaneous reduction of CaO and SiO <sub>2</sub> carbon	Exploratory	1992

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167	Rapid solidification through cold dye dipping in the molten alloy	Exploratory	1992
168	Studies on corrosion resistance of solar selective black anodized coatings on aluminium	Exploratory	1992
169	Studies on effect of corrosion on magnetic and mechanical properties of annealed rapidly solidified Fe-Si-B fibres	Exploratory	1992
170	A study of the purification of Si by the method of crystallization from molten solution	Exploratory	1992
171	Mineralogical characterization of chromite overburden from TISCO and OMC Mines	Exploratory	1992
172	Processing of the stainless steel pickling bath sludge of Salem plant	Exploratory	1992
173	Sulphuric acid leaching of zinc silicate ore	Exploratory	1992
174	Production of Ca-Si with Tata Steel	Interactive	1992
175	De-ashing of West Bokaro Coal for stamp charging with Tata Steel	Interactive	1992
176	Recovery of gold from exhausted dross for Govt. of India Mint	Sponsored**	1993
177	Studies on creep properties of steel grade GS-17 Cr, Mo V 511	Sponsored**	1993
178	Bench scale study of magnesite sample of Karnataka	Sponsored**	1993
179	Bench scale studies on chromite ores from Sukinda	Sponsored**	1993
180	Evaluation of boiler furnace and super heater tube	Sponsored**	1993
181	Failure analysis and material selection criteria for assorted coal field equipments	Sponsored**	1993
182	Characterisation of cast iron umpire sample	Sponsored**	1993
183	Physico-chemical evaluation of iron ore, limestone, dolomite & quartzit	Sponsored**	1993
184	Studies on clinker samples for microscopic Examination	Sponsored**	1993
185	Mechanical properties of advanced ceramics	Grant-in-Aid	1993
186	Beneficiation and purification of tungsten ores of India	Grant-in-Aid	1993
187	Production of Ca-Si with Tata Steel	Collaborative	1993
188	Development of deep drawing and extra deep drawing grade steel with Tata Steel	Collaborative	1993
189	Evaluation of NML Passivator (Galvasave) in Tube Division of Tata Steel	Collaborative	1993
190	Remaining life assessment of process heater tubes for Tata Steel	Collaborative	1993
191	Improvement in the flux used for galvanising with Tata Steel	Collaborative	1993
192	Feasibility studies of column flotation to improve the quality of copper concentrate at Malanjkhand Project	Consultancy**	1993



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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
193	Studies on multimetal deposits of Nagaland for DGM, Nagaland	Consultancy**	1993
194	Characterisation studies on gold and tungsten ore sample from Purulia and Bankura respectively	Consultancy**	1993
195	Efficacy of multimetal preparation of lowering of alumina content in Noamundi and Joda iron ore slimes for Tata Steel	Consultancy**	1993
196	Characterisation of cast iron umpire sample	Consultancy**	1993
197	Advisory consultancy for reduction of flotation reagent in iron ore beneficiation at Kudremukh Iron Ore Co. Ltd.	Consultancy**	1993
198	Energy consumption of Usha Alloys	Consultancy**	1993
199	Process flow sheet for Sukinda chromite ore	Consultancy**	1993
200	Graphitization kinetics of carbon and structural changes	Exploratory	1993
201	Interference free estimation of common alloying elements in steel samples by flame AAS using computational technique	Exploratory	1993
202	Determination of ultra trace amounts of gold in ore samples by ICP-OES	Exploratory	1993
203	Software for online data acquisition storage and modelling of creep curve	Exploratory	1993
204	Development and equilibrium model for a smelting reduction process for making liquid iron	Exploratory	1993
205	A new approach for WO <sub>3</sub> to W reduction via DIET (Desorption Induction by Electronic Transitions)	Exploratory	1993
206	Extraction of copper and precious metals from through hydrometallurgical route	Exploratory	1993
207	Compliance Crack length relations for four point bend specimens	Exploratory	1993
208	Role of organics on metallic recovery in dilute hydrochloric leaching of sea nodules	Exploratory	1993
209	Effect of sequestering agents in reducing iron carry-over in galvanising	Exploratory	1993
210	Importance of sample size, probability and confidence in fatigue testing under influence of notch and reactive environment	Exploratory	1993
211	A novel technique for modification of hyper-eutectic aluminium silicon piston alloys	Exploratory	1993
212	Development of ceramic crucible	Exploratory	1993
213	Correlation of magnetic properties with structure of Cr-Mo steels (Processes heater tubes) during service	Exploratory	1993
214	Microalloyed steel as a soft magnetic material for hydroge nerators	Exploratory	1993
215	Dephosphorisation of high silicon hot metal using lime based fluxes adopting injection techniques	Exploratory	1993

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216	A selective and sensitive spectrophotometric method for the determination of Niobium	Exploratory	1993
217	De-ashing of non-coking coal for BF injection with Tata Steel	Interactive	1993
218	Evaluation of NML-passivator in the Tubes Division of TATA Steel	Interactive	1993
219	Prevention of rust of MBP coils during transit and storage with Tinsplate Company of India Ltd.	Interactive	1993
220	Increasing oxidation resistance of carbon/graphite products by high temperature heat treatment with Tata Steel and Steel Authority of India Ltd,	Interactive	1993
221	Preparation of high purity $Mn_3O_4$	Exploratory	1994
222	Water model study for design parameters CC tundish improvement	Exploratory	1994
223	A new method for estimation of ultratrace silicon	Exploratory	1994
224	Selective chelatometric determination of Zinc, Calcium and Magnesium in Zinc Ores	Exploratory	1994
225	Development of a process for reducing the galvanised coating weight	Exploratory	1994
226	Comparative studies on the localised corrosion resistance of Ni substituted stainless steel	Exploratory	1994
227	Studies on the reduction and sintering behaviour of the flux composite pellets (FCP)	Exploratory	1994
228	Solidification behaviour of Al and Cu-Ni Alloys under electric/magnetic field	Exploratory	1994
229	Preparation of composite powders in the Si-C-Al-N system using silica from rice husk	Exploratory	1994
230	Calometric study of hydrated calcium aluminates	Exploratory	1994
231	Development of zircon-zirconia refractory composites for tundish nozzles	Exploratory	1994
232	Studies of the change in microstructure and composition of matrix and carbides in low alloy Cr-Mo steels during long term aging	Exploratory	1994
233	An extension compliance crack length (CCL) relation for standard fracture mechanics specimen	Exploratory	1994
234	Fracture toughness and impact resistance studies of $Al_2O_3$ wear resistant ceramics developed at NML	Exploratory	1994
235	Recovery of high purity copper and ferro-nickel from converter slag through hydro and pyro-metallurgy techniques	Exploratory	1994
236	Finite element analysis of standard chord supported arc bend (A)-(B)-(C)	Exploratory	1994
237	Advanced high strength ferrous alloys	Grant-in-Aid	1994

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
238	Characterisation studies on gold samples from Purulia & tungsten samples from Bankura	Sponsored **	1994
239	Beneficiation characteristics of magnesite samples through bench scale studies	Sponsored**	1994
240	Study of quartzite for 75 ferro-silicon production	Sponsored**	1994
241	Cold model studies of fluid flow in pneumatically agitated metallurgical vessel	Exploratory	1995
242	High permeability Fe-Al soft magnetic alloys	Exploratory	1995
243	Development of Pb-Al alloys for storage battery	Exploratory	1995
244	Microstructural Characterisation of Micro-Alloyed Dual Phase Steel	Exploratory	1995
245	Studies on Sedimentation Kinetics of Iron Ore Slimes under various conditions and Empirical modelling	Exploratory	1995
246	Electroless Nickel Coating on Graphite/Ceramic Powder	Exploratory	1995
247	Dephosphorization of Ferro-Manganese using basic fluxes	Exploratory	1995
248	Mathematical simulation of Si-transport in blast furnace	Exploratory	1995
249	Analysis & modelling of microscopic interaction in fine powders using X-ray fluorescence	Exploratory	1995
250	Software for assessment of flaws in engineering structure	Exploratory	1995
251	Development of alumina dry cell	Exploratory	1995
252	Direct sulphation of chalcopyrite by steam and oxygen	Exploratory	1995
253	Studies on efficiency of multi-gravity separator for the recovery of chromite from slimes	Sponsored**	1995
254	Briquetting of phosphate concentrate received from Rajasthan State Mines & Minerals Ltd.	Sponsored**	1995
255	Characterisation studies on overburden rocks of Kathara Colliery	Sponsored**	1995
256	Investigation on failure of water wall tubes	Sponsored**	1995
257	Investigation on water wall tubes of boilers of Bongaigaon Thermal Power Station	Sponsored**	1995
258	Metallurgical investigation for the estimation of remaining life of CCU reactor of M/s. HPCL, Vishakhapatnam	Sponsored**	1995
259	Studies on upgradation of iron ore slimes by multi-gravity separator	Sponsored**	1995
260	Sampling and evaluation of raw materials: Iron ore, Coke, Dolomite & Limestone	Sponsored**	1995
261	Developmental work of melting, forging of steels	Sponsored**	1995
262	Advice on Magnesite source selection	Consultancy**	1995
263	Advice on Ferro-vanadium alumina sludge	Consultancy**	1995
264	Advice on the use of MGS to minimise Cr loss with slimes	Consultancy**	1995
265	Atmospheric corrosion of steel from Tisco	Collaborative	1995

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266	Increasing the oxidation resistance of carbon graphite products by high temperature heat treatment	Collaborative	1995
267	Production of nano-sized alumina zirconia etc.	Collaborative	1995
268	A modified pickling bath for sulphuric acid	Collaborative	1995
269	A new method for determination of chromium by amplification reaction	Exploratory	1995
270	Removal of arsenic from ground water using low cost material	Exploratory	1995
271	Differential spectrophotometric determination of high tungsten	Exploratory	1995
272	Residual life estimation of engineering components at elevated temperature	Exploratory	1995
273	Studies on intergranular corrosion (IGC) of stainless steel (SS) in zinc chloride and it's control by using inhibitors	Exploratory	1995
274	Studies on the effect of Si/Fe ratio on the corrosion behaviour of Al-Si alloys	Exploratory	1995
275	Smelting reduction of fluxed composite reduced iron pellets	Exploratory	1995
276	Analytical software development for optimisation of ferro-alloy processes with specific application to ferro-chrome production	Exploratory	1995
277	Bonding characteristics of alumina	Exploratory	1995
278	Residual stress measurement on welded samples/ components by various methods	Exploratory	1995
279	Development of torpedo ladle car mixers/ bricks- M/s. Associated Cement Co. Ltd. Katni	Sponsored**	1995
280	Sampling and evaluation of raw materials M/s. Usha Martin Industries, Jamshedpur	Sponsored**	1995
281	Investigation of the corrosion problem of a boiler drum in Boiler House No. 1, -Tisco, Jamshedpur	Sponsored**	1995
282	Characterisation studies on gold samples from Purulia and tungsten samples from Bankura, West Bengal - Directorate of Mines and Minerals, Government of West Bengal	Sponsored**	1995
283	Studies on efficiency of multi-gravity seperator for the recovery of chromite from slimes- TISCO, Jamshedpur	Sponsored**	1995
284	Advice on the use of multi-gravity seperator to minimise chromium loss with slimes TISCO, Jamshedpur	Consultancy**	1995
285	To assess the reproducibility of the process flow sheet for phosphate sample from Uganda and give recommendations M/s. Rajasthan State Minerals Limited, Jaipur	Consultancy**	1995
286	Development of a technological flowsheet for production of phosphate concentrate and recommendations- M/s. Rajasthan State Minerals Limited, Jaipur	Consultancy**	1995
287	Deformation behaviour of g-TiAl alloy	Exploratory	1996

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
288	Studies on deformation twinning in B-Sn by acoustic emission	Exploratory	1996
289	Investigation on in-situ formation of CMC from alumino-silicate minerals	Exploratory	1996
290	Magnesium metal matrix composites by liquid metallurgy techniques	Exploratory	1996
291	Alternative route for production of compacted graphite iron	Exploratory	1996
292	Corrosion behaviour of silver based brazing filler alloys in different environment	Exploratory	1996
293	Production and characterisation of the atomised powder from DRI	Exploratory	1996
294	Development of high duty cast iron from cupola melt	Exploratory	1996
295	High strength aluminium alloys for LPG cylinder applications	Exploratory	1996
296	Lowering of ash content in a non-coking coal from Sasti area, Ballarpur seam (CMPDIL) by gravity method and froth flotation	Exploratory	1996
297	Grindability study on limestone using factorial design of experiments	Exploratory	1996
298	Processing of the spent catalysts of petroleum industry	Exploratory	1996
299	Recovery of cobalt, nickel and copper from the dump slag of copper industry	Exploratory	1996
300	Utilization of fly ash for preparation of glass	Exploratory	1996
301	Bioleaching of copper converter slag for recovery of copper, nickel and cobalt	Exploratory	1996
302	Development of copper graphite composite material	Exploratory	1996
303	Magnesium impregnation in liquid using steel capsule bullet	Exploratory	1996
304	Beneficiation of iron ore and synthesis of high quality ferrites-M/s, Kudremukh Iron Ore Co. Ltd., Bangalore	Sponsored**	1996
305	Beneficiation studies on phosphatic soil from Uganda and production of 200 kg concentrate- M/s. Rajasthan Mines and Minerals Ltd., Udaipur	Sponsored**	1996
306	Survey inspection/registration diagnostic X-ray and other related installations/ equipments - Atomic Energy Development Board	Sponsored**	1996
307	Assessment of the suitability of use of blast furnace shell plate sections with Surface Dent Markings at Southern Iron & Steel Co. Ltd., Salem, Tamil Nadu- M/s. Simplex Engg. and Foundry Ltd., Calcutta	Sponsored**	1996
308	Failure investigation of L.V.G.O. heat exchanger brass tube of Mathura Refinery - Indian Oil Corporation	Sponsored**	1996



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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
309	Development of laminated brass to required specifications Indian Ordinance Factory, Kanpur	Sponsored**	1996
310	Development of HSLA Steel Naval Chemical and Metallurgical Laboratory, Bombay	Sponsored**	1996
311	Preparation of nickel based super alloy- ISRO, Trivandrum	Sponsored**	1996
312	Evaluation of creep stress rupture properties of zirconium 2.5% Nb alloy - BARC, Bombay	Sponsored**	1996
313	Development of technology for production of low aluminium ferro silicon- SAIL, Ranchi	Sponsored**	1996
314	Bench scale studies on limestone sample (Gola, Demu, Bugtibada, Bhallumath and bentonite) and pilot plant studies on limestone samples (Gola, Demu) - Directorate of Mines & Geology, Govt. of Bihar, Patna	Sponsored**	1996
315	Melting, casting & processing of special steels Naval Chemical Metallurgical Lab, Bombay	Sponsored**	1996
316	Melting and Forging of super alloy for Vikram Sarabhai Space Centre	Sponsored**	1996
317	Bench scale study on Durgawati Bauxite for reduction of Fe <sub>2</sub> O <sub>3</sub> and TiO <sub>2</sub> content for Indian Aluminium Co. Ltd., Calcutta	Sponsored**	1996
318	Melting and heat treatment of super alloys for Vikram Sarabhai Space Centre, Trivandrum	Sponsored**	1996
319	Mechanical property evaluation and creep life prediction of service exposed reactor plate and column 01 material BPCL, Bombay	Sponsored**	1996
320	Mechanical properties of advanced ceramics Indo-US Project	Grant-in-Aid	1996
321	Beneficiation and purification of tungsten ore of India DMRL, Hyderabad	Grant-in-Aid	1996
322	Production of nano-sized alumina, zirconia etc. Tata Steel	Collaborative	1996
323	Increasing the oxidation resistance of carbon graphite products by high temperature heat treatment SAIL, Ranchi	Collaborative	1996
324	Consultancy for ferro-vanadium alumina sludge M/s. Shree Balaji Vanadium Company Pvt. Ltd., Korba	Consultancy**	1996
325	Feasibility studies of column flotation for the beneficiation of lead & zinc concentrates of Rampura-Agucha project Hindustan Zinc Limited	Consultancy**	1996
326	Beneficiation of low grade magnesite M/s.Dalmia Magnesite Corporation, Salem	Consultancy**	1996
327	Development of indigenous column flotation technology for industrial application for DOM DST/HZL	Consultancy**	1996
328	Improvement of grade and recovery of graphite concentrate at Tamin Graphite Plant at Sivaganga M/s. Larsen & Toubro Ltd.	Consultancy**	1996

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<i>Sl. No.</i>	<i>Title</i>	<i>Category</i>	<i>Year</i>
329	Technical assistance for the standardisation of hardness test blocks M/s. Fine Manufacturing Industries Ltd., Miraj	Consultancy**	1996
330	Efficacy of multigravity separation for lowering alumina content in Noamundi Iron Ore slimes TISCO, Jamshedpur	Consultancy**	1996
331	Advisory consultancy for the preparation of tender paper for a coal beneficiation plant M/s. IGP Engineers Ltd., Madras	Consultancy**	1996
332	Advisory service for preparing the grade (quality) of Pyrophyllite M/s. Eastern Minerals Bhagwantpura, Jhansi	Consultancy**	1996
333	Fly ash based wear resistant ceramic products Tatanagar Bricks Ltd., Jamshedpur	Consultancy**	1996
334	Studies on quartzite including other for production of 75% FeSi Bhutan Ferro Alloys, Bhutan	Consultancy**	1996
335	Assisting in setting up Lab of NTRL National Testing Research Laboratory, Calcutta	Consultancy**	1996
336	Advisory service to reduce the power consumption in Calcium carbide plant Panyam Cement Minerals Industries, Andhra Pradesh	Consultancy**	1996
337	To advice source of zinc dust for waste recovery Indo Deutsch Pvt. Ltd., Bombay	Consultancy**	1996
338	Improvement of grade and recovery of Shivganga Graphite Concentrate for M/s. Larsen & Toubro, Calcutta	Sponsored**	1996
339	Flotation column for the beneficiation of gold ores	Sponsored**	1996
340	feasibility studies for M/s. Bharat Gold Mines Ltd., Kolar		
341	Flotation studies on Domissiat Uranium Ore for CUCIL, Jaduguda	Sponsored**	1996
342	Establishment of tundish design parameter through modelling studies for high quality continuous cast products by Dept. of Science & Technology, New Delhi	Grant-in-Aid	1996
343	Demonstration of column flotation technique for improvement on the existing beneficiation process for M/s. GMDC and CSIR	Consultancy**	1996
344	Flotation column for the beneficiation of gold ores cum feasibility report for M/s. Bharat Gold Mines Ltd., Kolar Gold Fields	Consultancy**	1996
345	Modification in pollution control system for M/s. UMIL Rolling Mill Divn., Agra	Consultancy**	1996
346	Development of Ni free austenitic stainless steel M/s. DMRL, Hyderabad	Collaborative	1996
347	Development of ceramic floor wall tiles using iron ore slime for M/s. Kudremukh Iron Ore Company Ltd., Bangalore	Sponsored**	1997

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348	Pb, Zn ore of Ganesh Himal Ore for M/s. Nepal Metal Co. Ltd., Kathmandu	Sponsored**	1997
349	Studies for processing for Wolframite pre-concentrates and graphite flotation concentrates for M/s. NMDC, Hyderabad	Sponsored**	1997
350	Sintering studies on iron ore from Goa for M/s. Damodar Mangaljee Co. Ltd., Goa	Sponsored**	1997
351	Pilot plant column flotation tests at Nandidurg Mines Mill for M/s. Bharat Gold Mines Ltd., Kolar Gold Fields	Consultancy**	1997
352	Assessment of quartz quality of Gudur Mines for M/s. Grindwell Norton	Consultancy**	1997
353	Advice for improvement of chemical Lab at MISCO for M/s. Midwest Iron & Steel Co. Ltd., Hyderabad	Consultancy**	1997
354	Preparation of report on the consumption of power in the use of DRI in EAF for M/s. UMIL, Jamshedpur	Consultancy**	1997
355	Consultancy in preparation of radiator coolant (PRIXOL) for M/s. P.G. Enterprises, Jamshedpur	Consultancy**	1997
356	Development of magnetic material for portable hydrogenerator using micro alloyed steel of Tata Steel M/s. Tata Steel	Collaborative	1997
357	Reverse flotation for the beneficiation of Madukarai limestone for M/s. Associated Cement Companies, Coimbatore	Consultancy**	1997
358	Beneficiator of low grade lime stone for M/s. ACC Cement Works, Jhinkpani	Sponsored**	1998
359	Development of ceramic tiles from ferro chromic and other industrial wastes for M/s. Ferro Alloys Corporation Ltd., Vishakhapatnam	Sponsored**	1998
360	Production & standardisation of raw materials for Artisanal blacksmiths in rural sector DST, New Delhi	Grant-in-Aid	1998
361	Iron ore upgradation to reduce alumina and utilisation of fines and sinter for M/s. TIFAC, New Delhi	Consultancy**	1998
362	Advise towards improvement in flotation plant particle for M/s. ACC, Chaibasa	Consultancy**	1998
363	Training lecture with respect to metallurgical failure of pressure pipes and tubes at IB Thermal Power Station for M/s. IB Thermal Power Station, Jharsuguda, Orissa	Consultancy**	1998
364	Assistance and guidance on the project Atmabodh for CCR & D C/o. Director, DEBEL, Bangalore	Consultancy**	1998
355	Air pollution control system for installation in foundries for Indian Foundry Association, Calcutta	Consultancy**	1998
366	Development of inhibitor for recirculating cooling water systems at coke ovens at LD-1 for M/s. TISCO	Collaborative	1998