



***Chairman & Members of the Research Council, Invitees
and Dear Colleague,***



Welcome to the 62nd Research Council meeting of CSIR-NML. It is my proud privilege to welcome our chairman Shri H M Nerurkar and the other esteemed Research Council members for this meeting. It is two and half years since this Research Council assumed office and I wish to thank the Research Council especially its chairman for the counsel and guidance in steering this laboratory in the path to sustained relevance and excellence and towards achieving our Vision. Since we last met in February this year, several things have happened on many fronts. Firstly, I will briefly showcase our performance, the progress that we have made in several of the flagship and major sponsored projects, significant outcomes from the projects, new business initiatives launched, laurels and achievements, human resource development and major events organized during this period. We continue to remain focused on our Vision@2022 of NML as a self-sustained technology centre and have continuously calibrated our performance against the Goals and Targets that we had set ourselves towards realizing this Vision. My colleagues will present the Human Resources as well the Research Planning and Business Development road map towards attaining the set goals in the 12th plan period. The 12th Five Year Plan projects have been initiated and I would brief the Research Council on the start that we have made in these national mission projects.

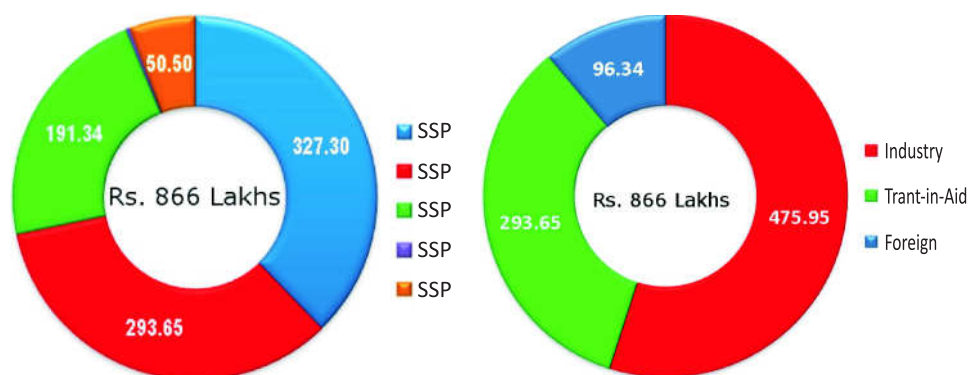
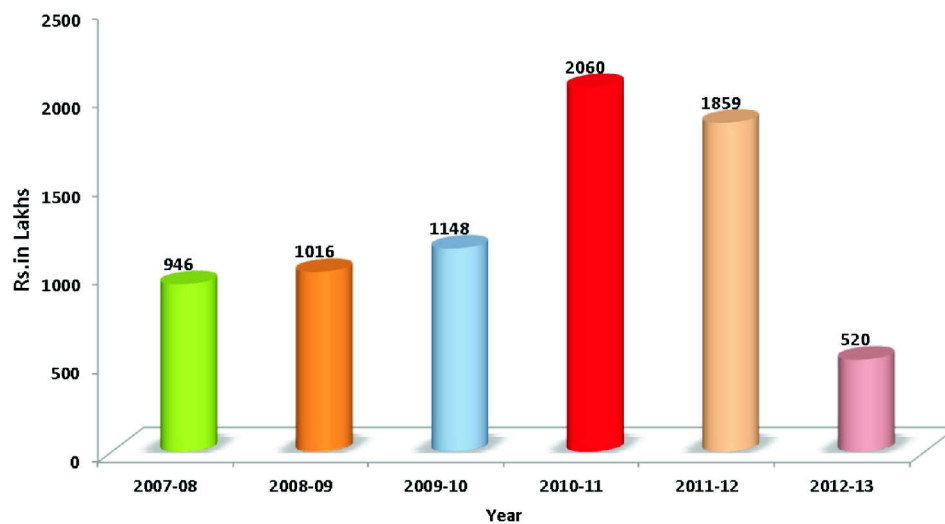
In this Research Council meeting, my colleagues will present on some of the major technologies developed by us in the past one year. This will be followed by scientific presentations on some exciting research areas being pursued by us. On the societal front, we have taken up a major mission on sustaining and improving the competitiveness of the Moradabad Brassware cluster under the aegis of the National Innovation Council. A presentation on its present status will be made. We support a large number of projects through an internal project forum (*iPSG*) and the convener will summarize the significant outcomes from these internal projects. I am also very happy to inform the august Research Council that the *Academy of Scientific & Innovative Research (AcSIR)* has been established by an act of Parliament as an '**Institution of National Importance**' and the AcSIR Act was notified in the Gazette on 2 April 2012. NML has launched both direct PhD as well as an integrated MTech/PhD program under the aegis of AcSIR. The convener of AcSIR at NML will make a short presentation on our strategy, targets and roadmap under AcSIR.





Overall Performance Parameters

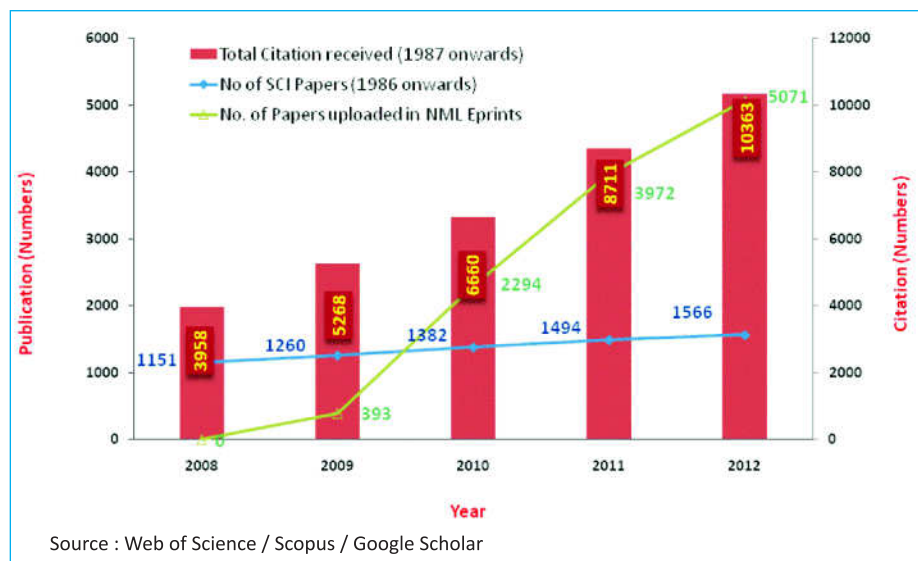
The External Cash Flow of CSIR-NML during January to June 2012 among the various categories of projects as well as the trend of the growth of (External Cash Flow) over the last 5 years is depicted below :



The overall external cash flow over the past six months as well as that achieved in this financial year has remained at the same level as the past two years. However, the significant difference has been that a major part of the external cash flow is from industrial funding and the component of government sponsored grant in aid projects has decreased progressively.

SCI Publications and Citations

The number of SCI publications since Jan 2012 is more than 50. As an institutional open sourcing policy, all NML Research publications are uploaded in NML's Institutional Repository. This has led to a substantial increase in the number of citations which as on date is 10363 for 1566 publications registering an increase of about 19% in the last calendar year. The average citation per paper is 6.62.

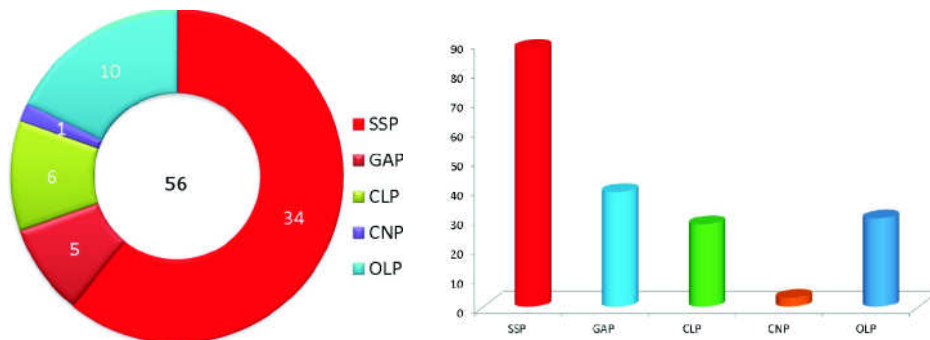


Showing Research Publications, Citation and NML Eprints

The NML Institutional repository (<http://eprints.nmlindia.org>) has maintained its global visibility and popularity with average hits of over 2.55 lakhs per month and a cumulative total of over 4.58 million hits since inception. A recent review by the "Registry of Open Access Repositories", UK has ranked the NML Institutional Repository at 5th in the country and 2nd among CSIR laboratories (Source: roar.eprints.org).

Project Outcomes

Currently, CSIR-NML is pursuing a large number of projects (188 ongoing projects) in diverse areas ranging from beneficiation and processing of low grade iron ores and coal funded by the Ministry of Steel, development of sodium extraction technology sponsored by the Heavy Water Board, critical projects for the strategic sector, several collaborative projects with industries especially Tata Steel, a large number of industry sponsored projects, projects sponsored by international clients, many innovative research projects funded by the grant-in-aid bodies and scientifically stimulating in-house projects. The current status on all of the ongoing and recently completed projects is given in the Agenda papers circulated and I will not repeat them here. I would restrict myself to listing some of the major outcomes from these projects:



Projects Undertaken : January-June, 2012

On-going Projects (as on June, 2012)



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The major outcomes are :

1. Commissioning of a 3-metrediameter Column for the beneficiation of Barites for M/s Indian Barytes & Chemicals Ltd., Mangampet, AP in collaboration with M/s McNally Bharat Ltd.
2. Implementation of a lacquer developed at NML for Brass artifacts at the Moradabad Brass cluster.
3. Successful development of a technology for the extraction of sodium from NaCl in a 500 Ampere closed electrochemical cell. About 13 kgs of high purity sodium was produced in a continuous campaign of the 500 Amp cell for a period of more than 20 days.
4. Commercialization of the technology for the production of pavement tiles from steel plant wastes.
5. Development of a technology for the production of cheap ferrosilicon from non-standard raw materials such as Banded Hematite Quartz (BHQ), Banded Hematite Jasper (BHJ) and Jhama coal.
6. Pilot scale smelting of Ni-Cr-Co bearing magnetite ores from Nagaland in a 500 kVA Submerged Arc Furnace.
7. Development of a technology for biomimetic nano-hydroxyapatite scaffolds.
8. Development of a portable hysteresis and Barkhausen emission magnetic sensing device (MAGSTAR) for remaining life assessment of steel pipes in thermal power plants.
9. Development of a GMI sensor with sensing device for structural integrity assessment.
10. Development of a portable non-linear ultrasonic device for fatigue damage assessment.
11. Fabrication and field trials of Nozzle Seat Ring and Spear cast from a new silt erosion resistant steel developed at CSIR-NML at a Hydroelectric plant.
12. Development of a technology for effective and efficient de-phosphorization of liquid metal in an induction furnace.



I wish to draw specific attention to the outstanding success of the Tata Steel NML collaborative projects. These projects include fundamental scientific investigations, research towards industrial solutions and new product/process development. Nineteen collaborative research projects that were initiated during 2010-11 have been completed and another seventeen projects have been taken up this year. Apart from the development and commercialization of the technology for paving blocks from steel plant wastes and the development of the technology for ferro-silicon from BHQ, BHJ and Jhama coal, a number of industrial solutions have been implemented. A protocol for ultrasonic NDT developed and implemented to minimize spalling losses and the



failure of rolls has led to complete elimination of roll failures, the development of a pelletization process for LD steelmaking is being adopted at Tata Steel, another joint project has led to the development of improved air-cooled rebars and the work on the development of plasma coating has enabled Tata Steel to go for a 5000 tons/month plasma coated rebar plant. The outcomes from the other projects are at various stages of implementation. This mutual and synergistic collaboration has been found to be very rewarding for both organizations.

Patents Filed

In the past six months, 14 patent applications have been filed out of which five applications have been filed jointly with Tata Steel Ltd. These are :

- (1) An improved process for the preparation of Hexaferrite powder with enhanced magnetic properties,
- (2) A process for the synthesis of tailor-made load bearing polymer based three dimensional hydroxyapatite nanocomposites as none graft,
- (3) A process for preparation of polymeric N-acrylamidotriazole compounds and the use thereof as anti-tarnishing agents and corrosion inhibitors of copper and copper alloys,
- (4) A non-invasive process for sorting of alumina rich iron ores,
- (5) A Process for the production of pure tungsten powder from tungsten-copper borings,
- (6) A process for preparation of Cu-based brazing alloys for joining steel components,
- (7) A process for the recovery of cobalt from discarded batteries of mobile phone,
- (8) A process for the recovery of neodymium as a value added product from waste hard disk of personal computers,
- (9) A device based on higher harmonic analysis of ultrasound waves for structural damage evaluation of in-service components,
- (10) A process for the production of directly reduced iron,
- (11) A process for the production of ferrosilicon using banded hematite quartzite,
- (12) A process for the production of ferrosilicon using banded Hematite Jasper,
- (13) A process for the production of ferrosilicon using low reactive coal and
- (14) A process for the conversion of hematite to magnetite using hydrogen gas.

MoUs /Agreements Signed

Since the last Research Council meeting, a large number of MoUs were signed with various clients including several international organizations. These are :

- (1) Casting and Fabrication of Nozzle Sheet Ring and Spear- M/s. Guru Nanak Engineering Works, Chandigarh,
- (2) Casting and Fabrication of Guide Vane Sealing Rings - M/s. S. K. Sales, Punjab,
- (3) Framework agreement for collaboration in research activities between the University of Santiago-De-Compostela and CSIR-NML-University of Santiago-De-Compostel, Spain,



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- (4) Process for producing iron from Jhama Coal and iron ore slime M/s. Tata Steel & Polybond Insulation Pvt. Bhilai,
- (5) Joint research on developing of coating materials, NDT techniques and magnetic sensing device techniques for damage assessment- M/s. NTPC New Delhi,
- (6) IP Search and Analysis Services- M/s. CSIR-URDIP, Pune,
- (7) Information disclosure agreement M/S. Tata Steel & Polybond Insulation Pvt. Ltd., Bhilai,
- (8) Industry sponsored joint research and development agreement- M/s. General Motor, (GM),
- (9) Mutual non-disclosure Agreement - M/S Renault Nissan Tech & Buss Cent,
- (10) Development of a process for making fibre reinforced hydroxyapatite nanocomposite three dimensional structure having load bearing properties - M/s. G. Surgiwear Ltd. Shahjahanpur,
- (11) Development of load bearing polymer hydroxyapatite composite - M/s. G. Surgiwear Ltd. Shahjahanpur,
- (12) Confidentiality & Secrecy agreement- M/s. Tata Motors Ltd., Mumbai,
- (13) R & D in area of mutual interest- M/s. Rashtriya Ispat Nigam Limited, Vishakhapatnam,
- (14) Suitable process for recovery of W & Co as yellow tungsten oxide and cobalt hydroxide respectively from tungsten carbide scrap.-M/s. Bharat Futuristic corporation, Bangalore,
- (15) Development and Fabrication of Annealing Simulator - M/s. Krisjan India, Jamshedpur,
- (16) Confidentiality and Non-disclosure Agreement - M/s. Tata Steel Limited, Jamshedpur,
- (17) Development of GMI based portable non-destructive magnetic sensing device for detection of carburization quantitatively for health monitoring of carburized - M/s. Indian Oil Corporation Ltd., Mumbai,
- (18) Non-Disclosure and Restricted use agreement - M/s. Siemens Technology and Service, Bangalore,
- (19) Providing technical expertise to CARIRI to study Corrosion Failure Problems of Industries in Trinidad & Tobago -M/s. Caribbean Industrial Research Institute, Trinidad & Tobago,
- (20) Assessing the corrosion of metal in the water path and underwater turbine parts and suggestion for selection of corrosion resistant system for Kopili HE Plant- M/s. NEEPCO, Shilong, (21) Water Treatment Process for Arsenic and Iron Removal - M/s. Fecon Engg. Pvt. Ltd., Kolkata.

Awards / Distinctions / Fellowships Received

- Dr. M.K. Jha, Dr. V. Kumar, Dr. B.D. Pandey, Dr. Rakesh Kumar, Dr. S. Chakravorty, Dr. S. Prakash, Mr. P.K. Choubey and Archana Kumari received **RECOM Award - 2011** (Global), under the KIGAM sponsored project - "Recovery of Pb and Sn from the



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liberated resin of PCBs swelled by organic (SSP-0496)" - the Best Feasible Process for "Recovery of Lead and Tin from discarded printed circuit board (PCBs)" jointly developed by KIGAM Daejeon, Republic of Korea & CSIR-NML Jamshedpur.

- CSIR-NML IMDC Team has been conferred with a **eWorld Jury Choice Awards for 2012** under the category of Best Initiative for Electronic Delivery of Services (EDS) for their project on Open access Electronic Document Delivery System.
- The Department of Official Language, Ministry of Home Affairs, Govt. of India has conferred "**Second Position**" upon TOLIC Jamshedpur for its commendable performance in implementing the official language policy of the Union during the year 2010-2011. In the citation, the contribution of its Member-Secretary Dr. Purushottam Kumar, Sr. Hindi Officer, NML was highly appreciated.
- Dr. M.M. Humane, Principal Scientist, MEF has been awarded **Raman Research Fellowship** for the year 2012-2013 for a period of 4 months to Ghent University, Belgium.
- Shri Abhilash, Jr. Scientist, MEF Division has been conferred upon **Fellow of Society of Applied Biotechnology**, Tamil Nadu.
- Ms. Kavita Parmar received **Best Oral presentation Award** for her paper entitled, "Removal of Pb(II) from aqueous solution using cobalt silicate precipitation tube (CoSPT) as adsorbent" at the International Conference on "Green Technologies for Environmental Rehabilitation" held at Gurukul Kangri University, Haridwar (Uttarakhand) during Feb 11-13, 2012.
- The 30th All India Rose Convention and the 23rd Annual **Flower Show** was organized by Tata steel, JUSCO and Horticultural Society Jamshedpur, during 6-8 January 2012; CSIR-NML participated in the Annual flower show and won **9 Nos. of prizes** in the different categories. Sri S. Naiya and Sri P.P. Pal of Engineering Division had participated as a delegate to the ALL INDIA ROSE CONVENTION from the CSIR-NML, Jamshedpur.
- CSIR-NML Staff Club won the "**Motivation Shield**" for the Blood Donation Camp organized at NML. The prize was given by the former Jharkhand Deputy Chief Minister Shri Sudhir Mahato in the 24th Annual Function of the Voluntary Blood Donors Association, Jharkhand held at Michael John Auditorium, Bistupur on 1st April, 2012.
- Shri Parmarth Suman won second prize in **Hindi Essay Competition** organized by Power Grid Corp. of India Ltd., Gamharia under the aegis of TOLIC, Jamshedpur, held on 20th March, 2012.

My congratulations to all of them.

Distinguished Visitors

- **Dr. Shekhar Nath**, Department of Biomedical Sciences, College of Life and Health Sciences Chubu University, Japan, delivered a lecture Jointly organized by NML and MRSI Jamshedpur Chapter on 1st January 2012 on the topic "Improvement of properties of calcium phosphate and titanium for orthopedic applications".
- **Professor Bhaskar S. Majumdar**, Materials and Metallurgical Engineering Department, New Mexico Institute of Mining and Technology, Socorro delivered a



lecture jointly organized by NML and MRSI Jamshedpur Chapter on 11th January 2012 on the topic “Textures in Shape Memory Alloys”.

- **Azdiar Adil Gazder**, Research Fellow, School of Mechanical, Materials & Mechatronics Engineering, University of Wollongong, New South Wales Australiadelivered a lecture jointly organized by NML and MRSI Jamshedpur Chapter on 13th January 2012 on the topic “The Effect of Warm and Cold Rolling on the Recrystallisation of 0.78 wt.% Cr Low Carbon Steel”.
- **Dr. Vasudeva Rao**, Director, IGCAR, Kalpakkam, delivered a lecture at NML on 19th January 2012 on “Materials Chemistry for Fast Breed Reactor”.
- **Dr. Kishor Sahu**, Post Doctoral Research Associate, Laboratory of Metal Physics and Technology, Swiss Federal Institute of Technology, ETH, Switzerland, delivered a lecture at NML on 1st February 2012 on “Understanding disorder: atomic to macroscopic system” .
- **Dr. N. Lakshmanan**, former director CSIR-SERC, Chennai, delivered a lecture at NML on 3rd February 2012 on “Interesting problems and innovative solutions”.
- **Dr. Bonta Srinivasa Rao**, postdoctoral research associate, IMDEA Materials Institute Madrid, Spain, delivered a lecture jointly organized by NML and MRSI Jamshedpur Chapter on 6th February 2012 on “Effect of grain refinement of pure Fe and Zr by different processing techniques”.
- **Dr. T. B. Gibbons**, C.Eng., FIM consultant (Material Technology), delivered a lecture at NML on 9th February 2012 on “High Efficiency power plants”.
- **Dr. Jayant Jain**, Post-doctoral Research Fellow, Institute for Technology Research and Innovation, Geelong Technology Precinct, Deakin University, Geelong, Australia, delivered a lecture at NML on 16th February 2012 on “Experimental and modeling study of deformation behavior of magnesium alloys”.
- **Prof. P. Rama Rao**, Chairman, Governing Council ARCI, Hyderabad, delivered the Prof. P. Ramachandra Rao Memorial Lecture on 21 March 2012 on “Milestone in Materials Evolution”. The lecture was presided over by Shri Anand Sen, Vice president of TQM & Shared Services, Tata Steel .
- **Prof. Yves Brechet**, Grenoble Institute of Technology & Member of the French Academy of Sciences, delivered a lecture on 17th April 2012 on “Plasticity under and after Irradiation from Damage at the Atomic Scale to Management of Ageing PWR Reactors.”
- **Sandvik Group**, from Sweden presented a lecture at NML on 16th April 2012 on “Sandvik product solution in the R&D functions of Metals, Minerals & Advanced Materials.
- **Prof. S.K. Kawatra**, Chairman Chemical Engineering, Michigan Technological University, USA, delivered a lecture at NML on 23rd April 2012 on “Challenges and opportunities in iron ore processing”.
- **Prof. Suprakash Roy**, Editor, Applied Radiation and Isotopes (Elsevier), Editor-in-Chief, Science and Culture, Indian Science News Association, Kolkata, INDIA, delivered a lecture on 24th April 2012 on “Science and Culture”



- **Dr. Rakesh Rajput**, consultant specialist Orthopaedic Surgeon; Dr. Sanjib Mukherjee, (consultant cardiologist), and Dr. Ramesh Agarwal, (consultant senior general & Laparoscopic advance surgeon), delivered lectures at CSIR-NML on 10th May 2012 on “Advances in osteoarthritis & Trauma”; “Stress & Heart diseases” and “Advance Laparoscopic Surgery” respectively. The lectures were jointly organized by NML, Institution of Engineers (India), and CSIR Pensioners Welfare Association (CPWA) Jamshedpur.
- **Dr. M. Narayana Rao**, Chairman & Managing Director, Mishra Dhatu Nigam Limited (MIDHANI), Hyderabad, delivered the National Technology Day-2012 lecture at CSIR-NML on 11th May, 2012.
- **Dr. Pinaki Biswas**, Senior Researcher, India Science Lab, General Motors, Bangalore, India, delivered a lecture at CSIR-NML on 18th June 2012 on “Crack tip fields and fracture mechanisms in single crystals”.
- **Dr. R. Sunder** of BiSS (P) Ltd, Bangalore, delivered a lecture at NML on 9th July 2012 on “Sequence Sensitive Threshold Stress Intensity and its Characterization”.
- **Prof. G. G. Roy**, Department of Metallurgical and Material Engineering, Indian Institute of Technology (IIT) Kharagpur, delivered a lecture at NML on “Cored Wire Injection in steel melt”, on 18th July 2012.
- **Mr. Aparup Sengupta**, Managing Director and Global CEO of aegis Ltd., Delivered a lecture at NML on “Leadership and Life” on 24th July 2012.
- Mr. George Greifzu from Germany, delivered lecture on “Mechanically induced reactivity of hydrothermally prepared Boehmite, on 24th July 2012.
- **Dr. DDN Singh** was deputed to take up a Foreign Consultancy Assignment at King Saud University, Riyadh, Saudi Arabia during 3-19 Jan 2012.
- **Mr. T.C. Alex** and **Mr. S. K. Nath** were deputed to ICTREM, Apatity in Russia during 10-18 March 2012 under Indo-Russian ILTP Bilateral visits.
- **Dr. J. Pal** was deputed to attend the TMS-2012 conference, Orlando, USA during 11-15 March 2012.
- **Dr. Sarmishtha Palit** was deputed to attend the 18th World conference on NDT, Durban in South Africa during 15-20 April 2012.
- **Dr. A.K. Upadhyay** and **Sri D. P. Singh** were deputed to Germany during 22-30 April 2012 for training on Spark Emission spectrometer.
- **Dr. S. Srikanth** was deputed as part of a CSIR Delegation to Australian Institute of Innovative Materials, University of Wollongong, Australia and to represent in the Global Research Alliance at Sydney, Australia during 22-30 April 2012.
- **Dr. Suprabha Nayar** was deputed to attend the International workshop on “Tools, Biomaterials & Implants”, Dhaka in Bangladesh during 17-18 May 2012.
- **Dr. B.D. Pandey** was deputed to hold discussions on bioleaching with KIGAM, South Korea during 10-16 June 2012.
- **Dr. G.V.S. Murthy** was deputed to attend the 35th Annual Review of progress in quantitative QNDE, Denver in USA during 15-20 July 2012.

Foreign Deputation

Human Resource

The following people have joined the laboratory in the past six months :

- **Mr. U.K. Jha**, S.O.(G) transferred from CSIR-Complex to NML Jamshedpur and joined NML on 09-04-2012,
- **Mr. Kumar Rahul**, S.O.(G) transferred from CSMCRI to NML Jamshedpur and Joined NML on 30-04-2012.

I welcome them amidst us wish them a very successful career at NML and a pleasant stay at Jamshedpur. Several colleagues also superannuated during this period. They were : Dr. Ajay Kr. Ray, Chief Scientist; Shri Balaram Dhibar, Security Guard; Md. Ibrahim Khan, Lab. Assistant, Dr. Sukomal Ghosh, Chief Scientist, Shri Jabdu Bhoi, Lab. Assistant; Shri P.P.L. Narayanan, Private Secretary; Shri B. Khageshwar Rao, Lab. Assistant. Shri Gurnek Singh, Lab. Assistant; has taken Volunteer retirement.

I wish them all a very happy & healthy retired life.

Academy of Scientific & Innovative Research

Under AcSIR, CSIR-NML has initiated Ph.D program as well as integrated M.Tech-Ph.D program in Metallurgical & Materials Engineering. The first batch of students for the Ph.D program was inducted in January'12. Admissions to the Ph.D program will take place twice in a year. To enable smooth functioning of AcSIR-NML, two committees have been formed : (1) Administrative Committee that will formulate and oversee the rules, guidelines and procedures applicable for the administration and management of all affairs related to AcSIR at NML and (2) An Academic Committee that will formulate and supervise the delivery of curricula and evaluation of students.

The 1st semester courses were conducted under AcSIR. In addition to scientists within CSIR-NML, several external faculty were utilized for the course work. These include Prof. Sandeep Sanghal, IIT Kanpur; Prof. Ranjit K Ray, TATA Steel; Prof. M Sundaraman, Univ of Hyderabad; Prof. Kalobaran Maiti, Tata Institute of Fundamental Research, Mumbai; Mr. S K Bhaduri, Geological Survey of India, Kolkata, Prof. H S Ray, Adjunct Professor, BESU; Prof. Dinabandhu Ghosh, Jadavpur, Kolkata; Prof. D Majumdar, IIT Kanpur; and Dr. R P Goel, Ex. Sr. Deputy Director, NML Jamshedpur.

School-NML Interactive Programme

The School-NML Interactive program (SNIP) launched by the Laboratory has completed a year now. More than 50 schools have been covered across East and West Singhbhum district of Jharkhand and the beneficiaries were more than 5000 school students of Std. VIII to XII. The program has drawn a wide popularity and appreciation from sections of the society and the press. Several schools from neighboring Bengal have also expressed their desire to visit NML and participate in the program. The program has been designed to inspire the students to take up a career in science and give them an exposure to the modern laboratory working practices.



Students participation in the School-NML interactive programme



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Transparency Portal

NML has launched a transparency portal in the first week of May 2012. The portal contains all information pertaining to staff (pay & allowances, immovable property held, foreign and local travel undertaken, Honorarium received), project details, expenditure pattern, CAG report, R&D information, namely - Research publication, Citations, Patents, Technology transfer etc.



White Space Mapping

The Business Development Group has started providing Business Intelligent Services to clients in the core areas of competence. The Group has created necessary infrastructure by procuring text mining software like *Vantage Point* and subscribing to various other databases. The White Space Mapping of the R&D programs: (1) Development of Zero Waste Technology for processing and utilization of thermal coal, (2) Development of commercially viable Magnesium Metal Production Technologies and (3) Development of technology for Cold Rolled Grain Oriented (CRGO) electrical steel that likely to be undertaken in the 12th plan projects have been prepared. The development of the new methodologies and algorithm for analyzing white space mapping of R&D programs/ technologies is being pursued through our in-house research program.

National Knowledge Network (NKN)

CSIR-NML is successfully linked with NKN grid with a bandwidth of 100 mbps. This has enabled access to the resources such as grid GARUDA of center for Development of Advanced Computing (C-DAC) and high end cluster computing resources of other institution.

Towards a Paperless CSIR-NML

The CSIR transformation ERP portal (ONE-CSIR) has been launched and the databases are being populated. It is expected that by September 2012 ERP would be operational online.





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12TH Plan Projects

CSIR-NML is leading three CSIR network projects under the 12th plan, out of which the following two were approved by the Standing Finance Committee:

- 1) *Development of Zero Waste Technology for Processing and Utilization of Thermal Coal*
- 2) *Development of Commercially Viable Magnesium Metal Production Technologies*

In addition to the financial sanction received from CSIR, NML will have committed industrial support of Rs. 5 crores for the second project and anticipates industrial support of around Rs. 3.5 Crores for the first.

Another proposed project *Development of Technology for Cold Rolled Grain Oriented (CRGO) electrical steel*, will be considered by the Expenditure Finance Committee (EFC) shortly. A tri-partite collaboration between CSIR, Tata Steel and Ministry of Steel will be the hallmark of this project.

In addition, CSIR-NML will be partnering various other CSIR laboratories in several network projects: 1) Clean technology build up for rare earths material needs in energy, health care and transportation (CSIR-RETECH); 2) Nanobioceramic-composites for wound care; 3) Development of Composite Armor for protection against medium caliber threats and 4) Measurement for Innovation in Science Technology for Improvement in Quality and Economy of Life (MISTIQUE). A few of these have been approved by the SFC, while the approval formalities will be put in place for the rest shortly.

A few other major projects are also proposed to be taken up by CSIR-NML under the 12th plan in partnership with the industry with partial financial support from the ministries. These were discussed in my previous communication.



10th August 2012


(S. Srikanth)
DIRECTOR

"If I have made any valuable discoveries, it has been owing more to patient attention, than to any other talent".

- Isaac Newton