



*A Quarterly Inhouse Bulletin*

# NML

# NEWS



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## CSIR Foundation Day celebrations



*Inaugural Function : Chief Guest Dr. D. Bhattacharya lighting the ceremonial lamp.*

The day-long CSIR Foundation Day Celebration at National Metallurgical Laboratory, Jamshedpur included, besides the formal function at the NML Auditorium, an essay competition among the staff, a debate competition among the school children and an Open Day for students, entrepreneurs and general public.

Dr. D. Bhattacharya, Director, National Institute of Technology, Jamshedpur formally inaugurated the function by lighting the lamp in a traditional way. The occasion was attended by eminent scientists, local entrepreneurs, school students, dignitaries, special invitees including retired personnel and the press.

The Chief Guest Dr. D. Bhattacharya in his address gave an overview on the CSIR Labs and the academia - for a joint venture incorporate, which was thought provoking. Earlier Mr. Premchand, Sr. Scientist introduced the chief guest.

Dr. R.N. Ghosh, Director Grade Scientist welcomed the gatherings. He briefed about different activities organised at NML as a part of CSIR Diamond Jubilee celebration over the year. Dr. Ghosh also briefed on CSIR and its evolution over the last sixty years. The CSIR society, an autonomous body with Prime Minister of India as the President and Union Science and Technology Minister as the Vice-President funded through the Ministry of

## IETE Bimal Bose Award



The coveted 19<sup>th</sup> IETE Bimal Bose Award, 2002-2003 has been conferred on Dr. S.K. Mandal, Scientist for his "outstanding contributions in the field of Power Electronics in the Broadest Sense". Dr. Mandal's contributions have seen recognised in the field of Design development, Testing of DC-DC converter systems, Solar Photo-voltaic Charge Controller systems, 4-10mA Telemetry systems, Automatic Cathodic Protection systems and AC/DC Motor drives at improved power factor. Various Pulse Width Modulation Techniques using latest switching devices such as Power Thyristors, Transistors and MOSFETS are very frequently used in these above systems.

Shri Mandal did his B. E. in Electrical Engineering (1983) (Jadavpur University), M. Tech. in Electrical Engineering (1985) (IIT Kanpur), Ph.D. (1999) in Electronics & Electrical Communication Engineering (IIT Kharagpur), and ICWAI (1994), Kolkata.



Top (L to R) Shri Premchand, Dr. D. Bhattacharya, Dr. R. N. Ghosh and Shri Rameshwar Dass  
Bottom : Dr. D. Bhattacharya, Director, NIT, Jamshedpur addressing the gathering.

Science and Technology Minister as the Vice-President funded through the Ministry of Science and Technology, Govt. of India came into existence on 26<sup>th</sup> September 1942 with a wide charter of functions. These included promotion guidance and co-ordination of scientific and industrial research, collection and dissemination of information on research and industry, founding of laboratories to further scientific and industrial research and exploitation of the research results for development of industry. CSIR was also charged with other tasks such as rendering assistance to other institutions, conducting research, awarding fellowships and publishing scientific journals. Presently, CSIR mission has been to provide scientific industrial R&D that maximise the economic, environmental and societal benefits for the people of India.

After a gap of 20 years, Govt. of India has launched the Science and Technology Policy – 2003 at the Indian Science Congress in Bangalore. The Scientific Policy Resolution of 1958 and the Technology Policy Statement of 1983 were the two policy pronouncements that inspired and guided the Nation's programmes and initiatives in S&T. The new policy integrates both Science and

Technology in a symbolic and holistic manner. This policy heralds us in the future realm of science and technology with our feet firmly rooted in our rich culture and heritage. A mere policy is not enough - it needs to be quickly and carefully implemented. We must expeditiously move forward to put together the instruments and mechanisms for its implementation.

CSIR has performed its assigned role in consonance with national needs and priorities. In the last 60 years, CSIR has emerged as a vibrant mammoth scientific and industrial organisation with wide-ranging competence, core strength and many major accomplishments. CSIR now has 38 laboratories and employs over 21,000 qualified and skilled manpower. These laboratories cover the whole gamut of Research and Development activity ranging from microelectronics to metallurgy; medicinal plants to industrial machinery; chemicals to molecular biology. CSIR has over the years developed over 3,000 technologies and has about 6,000 clients using its technologies. The annual industrial production based on CSIR techniques is estimated over USD 1 billion. The CSIR technologies have stood by Indian Industrialists at

difficult times when technologies were not accessible to them due to reasons other than technical or scientific.

Environmental consciousness coupled with economic urgency has been behind many of CSIR energy-efficient processes. A recent example is the retrofit technology for two and three-wheeler motor vehicles developed by Indian Institute of Petroleum, Dehradun. Going back in time, during sixties and seventies when Liquid Petroleum Gas was in short supply, most middle class housewives depended on kerosene wick stoves for cooking and sooty flame was a common problem of such stoves. CSIR developed a cleaner stove that not only provided more heat but also produced less soot. The new stove called Nutan became a rage among the housewives and is vogue even now.

Most of the iron ores in India have been characterised by the National Metallurgical Laboratory (NML), Jamshedpur and almost all the beneficiation plants are after the flow sheet prepared at NML. Further, with its bench and pilot plant scale (0.5 to 5tpd) facilities to treat metallic and non-metallic ores and full range of "state of art" characterisation facilities has successfully handled international assignments from Egypt, Syria, Nepal, Myanmar, Philippines, Malaysia, Bhutan and Thailand.

The Indo-Pak war of 1965, highlighted the strategic importance of the magnesium metal. Magnesium, required for wartime 'flares' in short supply and no one was willing to sell it to India. In a rousing response to this technology denial, by 1975 NML had built a stockpile for the defence sector. In 1980, the technology was licensed to private company. In 1990, CSIR won WIPO Gold Medal for development of Magnesium Technology.

CSIR has also contributed significantly to high sectors like aeronautics. It has designed and fabricated Hansa-3, a two-seater all-composite trainer aircraft. This commercially produced aircraft is being used and is gaining further market for training commercial pilots. Recently, a 14-seater multirole aircraft, SARAS, was worked out with CSIR commitment

to have the first test flight during this year. CSIR thus heralds an era of civil industry in the country.

While being active in acquiring patents, CSIR has also been protecting Intellectual Property Rights (IPR). The biggest challenge came in 1996, on the US patent granted on Turmeric Powder (Haldi). As a result of CSIR challenge, the US patent on turmeric was revoked (1997) and revocation of patents granted in case of neem, aayahusca and basmati (1998) followed with CSIR action. Thus has set a precedent for other developing nations to challenge the onslaught of western countries on their traditional knowledge. As India's strongest holder of Intellectual Property Rights, CSIR leads the way for protecting traditional knowledge strength while adding to the new IPR capital.

Hon'ble Prime Minister in the CSIR Society Meeting held on April 10, 2003, congratulated CSIR on its securing the second ranking as per the Patent Co-operation Treaty and expressed his happiness over the fact that CSIR has been granted 145 US Patents, almost 40% of the total patents granted to India.

The declining interest in Science as a career amongst our youth has been a matter of great concern. CSIR has drawn schemes like Research Fellowship (JRF & SRF), Research Associate, Funding of extra mural research schemes at universities/institutes; granting visiting Associateship; Travel/conference/Symposium Grants; Programme on Youth for leadership in Science; New Millennium Indian Technology leadership Initiative; Shyama Prasad Mukherjee Fellowship and so on to nurture young persons to take up R&D as a career.

CSIR has completed its Diamond Jubilee year and thus moving forward to complete many more years. The Tenth Five year plan has been formulated against the backdrop of high expectations in S&T. CSIR being amongst the larger R&D funded organisations in the industrial sector has an added responsibility of helping the Indian Industry to regain its lost growth rates and become competitive globally.

### **Inter School Science Debate**

As part of CSIR foundation celebration, Inter School Science Debate was held at NML on 19<sup>th</sup> September, 2003 wherein

eleven schools: (1) ADL Sunshine School, Sakchi; (2) Church School, Beldih Triangle; (3) D.A.V Public School, Bistupur; (4) DBMS English School, Kadma; (5) Jamshedpur Public School, Baridih; (6) Kerala Samajam Model School, Sakchi; (7) Loyola School, Beldih; (8) Motilal Nehru Public School, Sakchi; (9) Mrs. K.M.P.M. Inter College, Bistupur; (10) Rajendra Vidyalaya, Sakchi and (11) St. Mary's School, Bistupur participated. In a close contest, the winning fortune was showered on Shri Shamim Pervez and Ms. Rajender Kaur of Motilal Nehru Public School, Sakchi. The runners – up team was Kerala Samajam Model School of Sakchi, represented by Ms. Puja and Shri Aritra Sarkhel. Ms. Rajender Kaur has been adjudged as the best speaker.

Dr. S. Tarafder, scientist, NML was the moderator and added flavour in conduction of the debate. Dr. Shantanu Chakrabarti of Tata Steel, Dr. Keya Mazumder of Jamshedpur Women's College and Shri K.K. Gupta, scientist NML acted as the judge on this occasion. The prizes to the successful participants were awarded in the foundation day function.

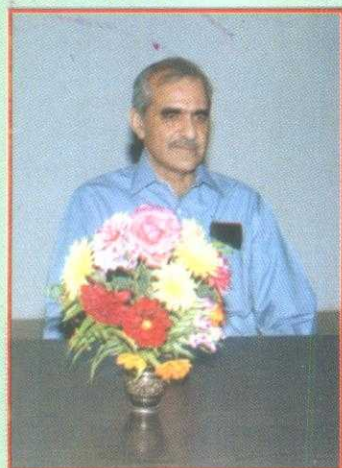
## **EXTRACTION OF MAGNESIUM FROM INDIGENOUS RAW MATERIALS**

Magnesium is fast emerging as an important structural material of commercial importance. The auto majors of the world such as Ford, BMW, Hyundai are investing significantly in the production of this metal since magnesium is expected to replace a significant portion of the existing structural material in the automobiles. India has vast resource of magnesium in the form of dolomite. NML has been pursuing a project funded by the Dept. of Mines and Dept. of Science & Technology. The aim of the project is to produce the magnesium metal using dolomite - the indigenous resource by electro thermal route. A pilot plant has been designed, fabricated, installed and commissioned to produce 100 kg magnesium per day. During the commissioning of trial run, magnesium sponge was produced which was remelted with suitable flux. Magnesium metal of 98% purity could be achieved. Further, after commissioning of the pilot plant, a number of trials have been conducted under different conditions to understand the process variables and slag chemistry. Efforts are being made to optimise the process conditions to achieve the desired recovery and purity of magnesium metal.



*Prof. S. P. Mehrotra, Director expressing his happiness over the production of magnesium during the trial run at NML Pilot Plant.*

## Message from Director



Prof. S. P. Mehrotra

I am once again glad to communicate with you through this formal periodical medium. Over the past one year, we have registered good progress in several fronts viz. Formalisation of our participation in seven of the 55 task force networked projects of CSIR and Leadership in one "Technology for Engineering Critical Assessment", take off of NDT centre, assignment of two major projects from DOD for advanced studies in extraction of metallic values from sea nodules, ISO 9001:2000 certification etc.

During the last one year of my stewardship here, I also felt it essential to review

the organisation and functions of the laboratory, a 53 year old centre of excellence in Metallurgical & Material Science R&D. I did this review with the help of several of my senior colleagues and other staff members. In the Life cycle of organisations too, a stage comes when it reaches a plateau in its performance. A review of organisation and its functions through conscious questioning of why we are doing what we are doing, how else we can do vis-à-vis changes in environment, may give valuable insights to take corrective measures and put back the organisation in the path of growth. The review, among other things was basically necessitated owing to the following:

- The concept of networking has been introduced in the CSIR system in a big way with about 55 networked projects, which promotes pooling of resources and the need to emulate this philosophy at the Laboratory level.
- Overlapping R&D programmes/projects across a few Divisions
- Dwindling number of scientists / staff in few Divisions owing to superannuations reducing the strength of personnel below critical mass.
- Pressure on Director's time with issues related to management of R&D and general administration, which can

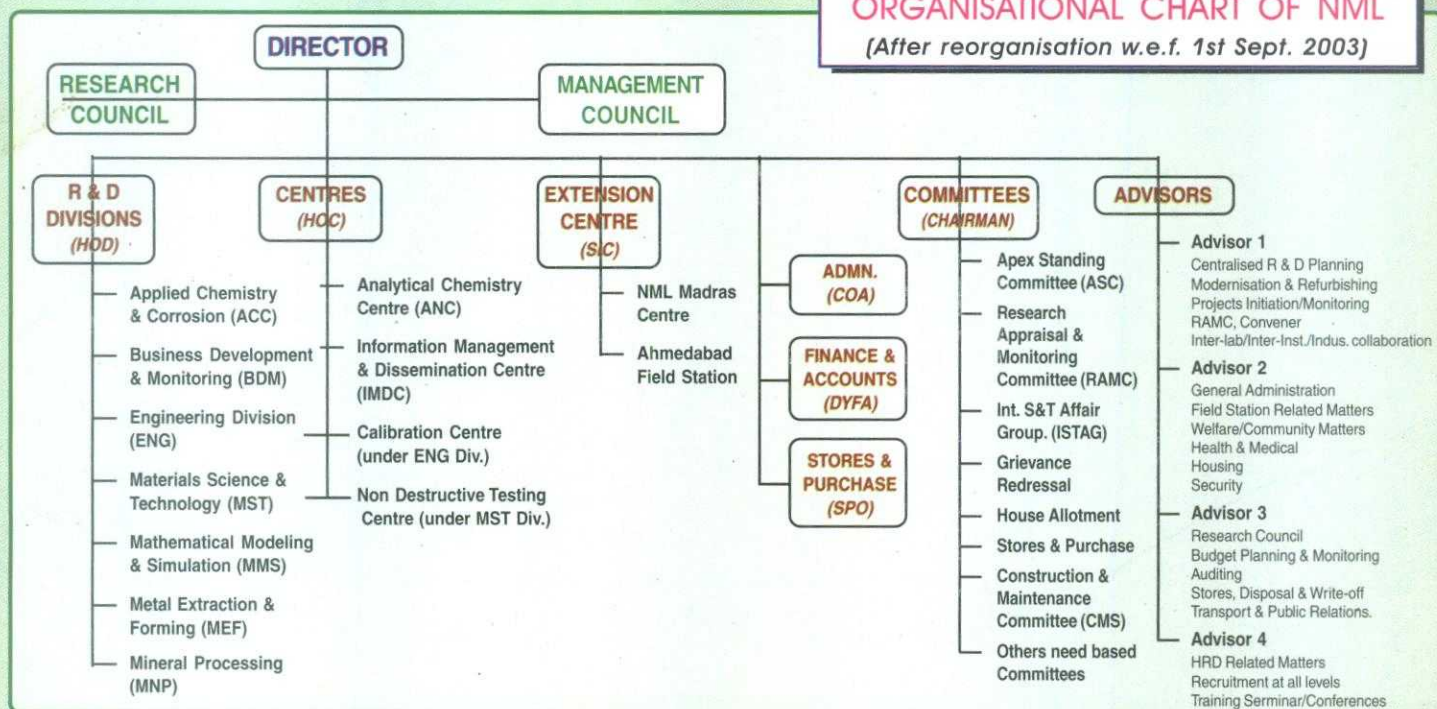
be handled with equal efficiency by senior level scientists.

- Need to delineate routine functions from R&D agenda of the Divisions to make both of them efficient and effective.

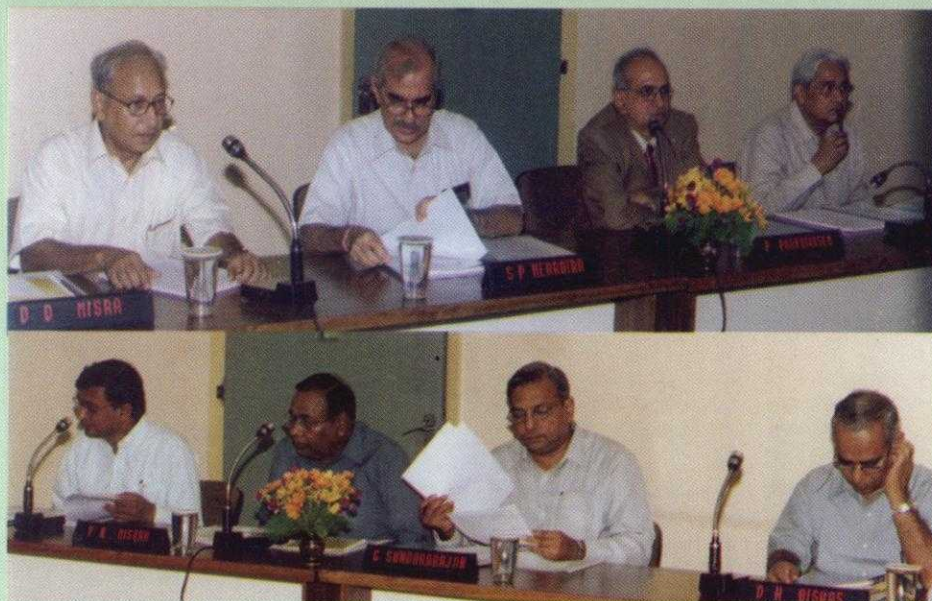
After the review, a re-organisation proposal was discussed with all scientists and technical officers on 8<sup>th</sup> April, 2003. Written suggestions also were invited and received. Based on this extensive interaction a final proposal on reorganisation of the Laboratory was discussed in a similar meeting on 26<sup>th</sup> May, 2003. The Management Council vetted this proposal on 15.07.03 and the same was submitted to the Research Council on 24.07.03 for information and expert inputs. According to the reorganisation the existing 13 Divisions would reduce to 7 and 4 centres would be created with functions culled out of the existing Divisions for better focus in their function and customer orientation. Position of two to four advisors created to shoulder the management of R&D and other administrative responsibilities for ensuring speedier response on matters related to the management of men, machinery, materials and money.

(Source : Director's Desk, July 2003)

## ORGANISATIONAL CHART OF NML (After reorganisation w.e.f. 1st Sept. 2003)



## 47th Research Council Meet



Top (L to R) : Prof. D.D. Misra, Prof. S.P. Mehrotra, Shri P. Parvathisem and Shri R. N. Parbat.  
Bottom (L to R) : Prof. T. Sundarajan, Dr. V.N. Mishra, Dr. G. Sundararajan and Dr. D. K. Biswas.

The 47th Meeting of the Research Council (RC) of the Laboratory was held on July 24, 2003. The meeting was attended by its Chairman, Shri P. Parvathisem, MD, Spex Engineering Pvt. Ltd. and members : Dr. G. Sundararajan, Director, International Advanced Research Centre for Power Metallurgy & New Materials, Hyderabad; Shri R. N. Parbat, Former MD, INDAL Hydro Extrusion Ltd.; Prof. T. Sundarajan, IIT, Chennai; Prof. D.D. Misra, Director, CMRI, Dhanbad; Dr. V.N. Mishra, Director, RRL, Bhubaneswar; Prof. S.P. Mehrotra, Director, NML; scientists and technical officers of the laboratory. The RC reviewed the progress made by the laboratory during the last six months and expressed happiness over the significant achievements presented in the meeting.

### Water Testing Lab to be set up by NML, Unicef

Jharkhand State will soon have its first state-of-the-art water testing laboratory, courtesy Unicef and National Metallurgical Laboratory. The Unicef team that was on a four-day visit to the city had hectic deliberations with NML scientists. NML has agreed to share the expertise, in terms of both technology and manpower, with Unicef in plugging the loopholes in water and sanitation projects being implemented by Unicef in East Singhbhum. NML is awaiting a formal proposal from the Unicef. The laboratory will be set up in Ranchi. Three regional centres will also be set up eventually. Sahebganj and Daltonganj are the two locations which has been decided and the third is yet to be finalised. Poor quality of drinking water, especially in villages of the six districts of the state where there projects (Water and Sanitation, Swajaldhara and the recent Total Sanitation Campaign) are being implemented under the Rajiv Gandhi National Drinking Water Mission, is a major cause of concern for Unicef. For, high iron, arsenic and acid content in drinking water supplied through

these projects are forcing the villagers turn towards other unhygienic sources of water. "In a model village, Dorkasai in Potka block, though all the 15 hand pumps installed there were functional, yet the villagers showed a marked aversion towards drinking that water," said Umesh Mehta, executive engineer, Phed, who had accompanied the Unicef team to the village. In other villages, pipes of hand pumps had broken down due to high iron content.

On enquiring from the Village Watsan Committee (VWSC) of Dorkasai, the villagers said due to extremely high iron content in the water, they were forced to consume river water or water from other hazardous sources. "The water testing laboratory at the office of the superintendent engineer, PHED, is not so sophisticated enough to study water quality. NML was approached as it has a separate wing on analytical chemistry and also has the required equipment and expertise for doing such work," said Nirmal Singh, district co ordinator.

(Source : H.T. July 25)

## Best Paper Award



Dr. R. K. Jana, Scientist has been awarded the Institute's Gold Medal for the year 2002-03 by the Mining Geological and Metallurgical Institute of India, Kolkata. The medal was awarded at the Institute's 97<sup>th</sup> Annual General Meeting held at Oberoi Grand Hotel, 15, J.L.Nehru Road, Kolkata.

The Medal was conferred on Shri Jana for his outstanding publications entitled, "Electrochlorination of sea nodules - a novel single step process for recovery of Cu, Ni and Co Published in MGMI Trans. Vol. 99 No. 1&2 (2002-03). The summary of his work is given below :

*The idea of using sodium chloride as electrolyte, readily available from sea water provided motivation to explore the possibilities of electrochlorination in the processing of sea nodules. In such a process, direct electrowinning of copper, nickel and cobalt from the Indian Ocean nodules has been attempted in the diaphragm cell using sodium chloride as the electrolyte. Initially, anodic polarisation studies were conducted to examine the electrodisolution of the desired metal from the sea nodules. It was revealed that the electrodisolution of oxide ore like sea nodules is feasible when sodium sulphide is mixed with such an ore body. The electrochlorination studies conducted by either using sodium chloride or ammonium chloride as electrolyte with the addition of sodium sulphide to the sea nodules yielded appreciable dissolution of the valuable metals. Subsequent polarisation studies suggest that direct electrowinning of metal at cathode with sodium chloride as electrolyte is possible only in the presence of buffering agents like acetic acid of formic acid. Finally electro-chlorination of sea nodules mixed with Na<sub>2</sub>S were carried out using 3M sodium chloride buffered with acetic acid or formic acid. About 98% each of copper, nickel and cobalt is electroleached during the electrochlorination. The cathode deposits were analysed to contain about 53% Cu, 58% Ni and 36% Co in 8 hrs or electrolysis. The cathode deposits have been characterized by XRD and SEM studies.*

## Papers Published

- **Bandyopadhyay D., Singh S.D., Sanyal D., Singh K.K. and Singh K.N.** 2003. A study on dissolution kinetics of carbon in liquid-iron bath. *Chemical Engineering Journal*, 94(2), pp. 79-92.
- **Bhagat A.N. Ranganathan S. and Mohanty O.N.** 2003. Electrical-resistivity studies in low-carbon and HSLA-100 Steels. *Materials Science and Technology*, 19(3), pp. 343-346.
- **Chakraborty J., Das S.K. Rao V. and Sinha A.** 2003. Behavior of iron-ion in the morphosynthesis of magnetite particles. *Materials Transactions*, 44(6), pp. 1124-1127.
- **Das S.K. and Godiwalla K.M.** 2003. Phase-field approach-A paradigm shift in metallurgical solidification modelling. *Indian Foundry Journal*, 49(7), pp. 17.
- **Kumar A., Tarafder S., Mukherjee S., Das S.K., Ravikumar B. and Chatteraj I.** 2003. Effect of plasma ion-implantation on the hydrogen embrittlement of Cu strengthened HSLA-100 steel. *Journal of Materials Science*, 38 (12), pp. 2667-2671.
- **Khanra A.K., Pathak L.C., Mishra S.K. and Godkhindi M.M.** 2003. Self-Propagating-High temperature Synthesis (SHS) of ultrafine  $Zr_2$  powder. *Journal of Materials Science Letters*, 22(17), pp.1189-1191.
- **Mehta K.D., Pandey B.D. and Mankhand T.R.** 2003. Studies on kinetics of biodissolution of metals from Indian-Ocean nodules. *Minerals Engineering*, 16(6), pp. 523-527.
- **Mishra H.N. and Das C.** 2003. A review on biological-control and metabolism of aflatoxin. *Critical Reviews in Food Science and Nutrition*, 43 (3), pp. 245-264.
- **Mishra S.K., Das S.K., Ramachandrarao P., Belov D.Y. and Mamyan S.** 2003. Synthesis of zirconium diboride-alumina composite by the Self-Propagating, High-Temperature Synthesis Process. *Metallurgical and Materials Transactions A-Physical Metallurgy and Materials Science*, 34A(9), pp. 1979-1983.
- **Mitra A., Kim H.Y., Shen B.L., Nishiyama N. and Inoue A.** 2003. Crystallization and magnetic-properties of Fe<sub>40</sub>Co<sub>40</sub> Cu<sub>0.5</sub>Al<sub>2</sub>Zr<sub>9</sub>Si<sub>4</sub>B<sub>4.5</sub> and Fe<sub>62</sub>Co<sub>9.5</sub>Gd<sub>3.5</sub>Si<sub>10</sub>B<sub>15</sub> amorphous-alloys. *Materials Transactions*, 44(8), pp. 1562-1565.
- **Mitra A. Panda A.K., Singh S.R., Rao V. and Ramachandrarao P.** 2003. Magnetic and structural behaviors of nanocrystalline Fe<sub>70.8</sub>Nb<sub>3.7</sub> Cu 1Al<sub>2.7</sub>Mn<sub>0.7</sub>Si<sub>13.5</sub>B<sub>7.6</sub> alloy. *Philosophical Magazine*, 83 (12), pp. 1495-1509.
- **Nachankar A.V., Vaish A.K., 2003 Humane M.M., De P.K. Moghe D.V. and Pathak S.U.** 2003. Bake hardening mechanism in steels. *J. Met. Mater Sci.*, 45 (4), pp. 143-160.
- **Panda A.K., Ravikumar B., Basu S. and Mitra A.** 2003. Crystallization and soft-magnetic properties of rapidly solidified Fe<sub>73.5</sub>Nb<sub>3</sub>Cu<sub>1</sub>Si<sub>22.5</sub>-Xbx (X=5, 9, 10, 11.25 19) alloys. *Journal of Magnetism and Magnetic Materials*, 260(1-2), pp. 70-77.
- **Panda A.K., Basu S. and Mitra A.** 2003. Demagnetization effect and its correction on the measurement of magnetic hysteresis loop of melt-spun ribbons. *Journal of Magnetism and Magnetic Materials*, 261(1-2), pp. 190-195.
- **Parashar S.K.S., Basu D.K., and Banerjee M.K.** 2003. Localised/galvanic corrosion of Mg-Zn-Al Alloy. *J. Met. Mater Sci.*, 45(3), pp. 137-141.
- **Sinha A., Nayar S., Murthy G.V.S., Joy P.A., Rao V. and Ramachandrarao P.** 2003. Biomimetic synthesis of superparamagnetic iron-oxide particles in proteins. *Journal of Materials Research*, 18(6), pp. 1309-1313.
- **Srikanth S., Rao D.S., Das S.K., Ravikumar B., Nandakumar K., Dhanuskodi R. and Vijayan P.** 2003. Combustion and deposit formation behavior on the fireside surfaces of a pulverized fuel boiler fired with a blend of coal and petroleum coke. *Combustion Science and Technology*, 175 (9), pp. 1625-1647.
- **Sinha A., Chakraborty J., Das S.K. and Ramachandrarao P.** 2003. Self-assembled growth of calcite particles on a tobacco film. *Current Science*, 84 (11), pp. 1437-1440.
- **Sinha I. and Mandal R.K.** 2003. Simulating the effect of glass microstructures on the crystallization and percolation behavior of glass-ceramics. *Journal of Non-Crystalline Solids*, 324 (1-2), pp. 36-49.
- **Sahoo K.L., Das S.K. and Murty B.S.** 2003. Formation of novel microstructures in conventionally cast Al-Fe-V-Si alloys. *Materials Science and Engineering A-Structural Materials Properties Microstructure and Processing*, 355 (1-2), pp. 193-200.
- **Sahoo K.L., Rao V. and Mitra A.** 2003. Crystallization kinetics in an amorphous Al-Ni-Mn-Fe alloy. *Materials Transactions*, 44(6), pp. 1075-1080.
- **Sahoo K.L. and Das S.K.** 2003. Effect of magnesium on sliding wear performance of Cast Al-8.3Fe-0.8V-0.9Si alloys. *Materials Science and Technology*, 19, pp. 959.
- **Vaish A.K., Minz R.K. and Prasad Y. Maruti.** 2003. Modern features for the optimum performance of blast furnace. *J. Met. Mater Sci.*, 43 (3) pp. 103-125.
- **Venkateswarlu K., Das S.K. Chakraborty M. and Murty B.S.** 2003. Influence of thermomechanical treatment of Al-5Ti master alloy on its grain refining performance on aluminum. *Materials Science and Engineering A-Structural Materials Properties Microstructure and Processing*, 351(1-2), pp. 237-243.

## Ongoing Sponsored R & D at NML

- Creep evaluation of power plant components for Central Mechanical Engineering Research Inst., (Project Leader: Dr. S. Choudhury)
- CLIP software for Central Mechanical Engg. Research Institute, (Project Leader: Dr. R.N. Ghosh)
- Biomimetic synthesis of super paramagnetic particles for diagnostic applications for Dept. of Science & Technology, (Project Leader: Dr. A. Sinha/S.Nayar)
- Nano crystallisation studies on cobalt containing bulk metallic glass for Dept. of Science & Technology, (Project Leader: Dr. A. Sinha/Dr. A. Pra)
- Development of self-assembled mesoporous aluminium phosphate through biomolecular templating for Dept. of Science & Technology, (Project Leader: Dr. A. Sinha/Dr. J. Chakravarty)
- Residual stress measurement of rails at JSPL, Raigarh for Jindal Steel & Poer Ltd., (Project Leader: Dr. S. Sivaprasad)
- Evaluation of retained austenite in new rotary slide valves for Hindustan Aeronautic Ltd., (Project Leader: Dr. S.R. Singh)
- Failure analysis of reformer tube for Indian fertilizers co-operative Ltd., (Project Leader: Dr. R. Singh)
- Failure analysis of pipes for Oil & Natural Gas Corporation Ltd., (Project Leader: Dr. S. G. Choudhari)
- Low temperature fracture behaviour of line pipe steel for Offshore Testing & Inspection, (Project Leader: Dr. S.S. Prasad)
- Mechanical profile and microstructural assessment of first stage turbine blade before and after rejuvenation for National Thermal Power Corporation Ltd., (Project Leader: Dr. S.R. Singh)
- Development of Al-Ti and Al-Ti-B master alloys and their thermo mechanical treatment for better grain refining efficiency for Dept. of Science and Technology, (Project Leader: Dr. K. Venkateswarlu)
- Thermomechanical characterisation of ceramic coating for combustion chamber liners/combustors lines for ARDB, Ministry of Defence, (Project Leader: Dr. A. Ray)
- Aerosol synthesis of nano-crystalline zirconia toughened alumina powders for Dept. of Science & Technology, (Project Leader: Dr. L.C. Pathak)
- Development of ultra low carbon bainitic steels for off-shore & on-shore structures for Dept. of Science & Technology, (Project Leader: Dr. L.C. Pathak)
- Studies on thermal characteristics of LCA brake sample for Aeronautical Development Agency, (Project Leader: Dr. A. J. Kailath)
- Biomimetic synthesis of inorganic materials under microgravity for ISRO, (Project Leader: Dr. A. Sinha)

- Relationship between microstructure and ultrasonic attenuation in Ti alloy and Ni alloys for AR&DB, (Project Leader: Dr. G.V.S. Murthy)
- Magnetic evaluation of fatigue damage and deformation (Indo US Collaboration Project) for Dept. of Science & Technology, (Project Leader: Dr. A. Mitra)
- Investigation on the fusion of rotary slide valve & sleeve for Indian Air Force, (Project Leader: Dr. S.R. Singh)
- Studies of the magnetic properties of Fe-Si alloys developed at VSSC for Vikram Sarabhai Space Centre, (Project Leader: Dr. A. Mitra)
- Evaluation of creep rupture properties of thermal power plant components for Central Mech. Engineering Research Centre, (Project Leader: Dr. R. Singh)
- Metallurgical investigation of failure of boiler tube for Jindal Steel & Power Ltd., (Project Leader: Dr. R. Singh)
- Stress rupture test for Uttar Pradesh Steels, (Project Leader: Dr. S. Choudhuri)
- Development of suitable materials to combat excessive abrasion wear in coal grinding mix component for Central Electricity Authority/CPRI, (Project Leader: Dr. D.K. Bhattacharya)
- Development of silt erosion resistant material for turbines of hydrogenerators for Central Electricity Authority/CPRI, (Project Leader: Dr. D.K. Bhattacharya)
- Assessment of boiler tubing based on stress rupture test for Central Electricity Authority/CPRI, (Project Leader: Dr. D.K. Bhattacharya)
- Residual life assessment of process gas and steam pre-heater for Chambal Fertilisers and Chemicals Ltd., (Project Leader: Dr. S. Chaudhuri)
- RLA work for two ebd rings of M.G.S. for CESC, (Project Leader: Dr. A. Ray)
- RLA work for end rings of Titagarh generating station for CESC Ltd., (Project Leader: Dr. A. Ray)
- Non-destructive Evaluation (NDE) Facility for infrastructure asset management for Dept. of Science & Technology, (Project Leader: Dr. D.K. Bhattacharya)
- Synthesis of Nd-Fe-B magnet alloy powder by chemical route for Dept. of Science & Technology, (Project Leader: Dr. V. Rao)
- RLA studies for M/s UBL, Jamshedpur for Associated Power Team (P) Ltd., (Project Leader: Dr. A. Ray)
- Synthesis, charac. And evaluation of anion supported mixed oxide nanocomposite mater. as solid acid catalyst for DST (Project Leader: Dr. T. Mishra)
- High strength formable steels for automobile applications for Tata Steel (Project Leader: Dr. A.K. Vaish)
- Studies on multi gravity separator for treating fine coal for Central Mine Planning and Design Institute Ltd. (Project Leader: Shri J.P. Srivastava)

## CSIR Diamond Jubilee Lectures

NML organised a series of lectures by eminent scientists to mark the Diamond Jubilee Year of CSIR. During July to September 2003, the following lectures were organised.

Prof. S.K. Gupta, Dept. of Chem Engg., Indian Institute of Technology, (IIT) Kanpur spoke on "Genetic Algorithm and its Use in the Multi-Objective Optimization of Industrial Processes" on 14 July, 2003.



*Prof. S.K. Gupta*

Prof. S.P. Mehrotra, Director, NML, Jamshedpur delivered the talk on "Mathematical Modelling: A Wonder Tool if Judiciously Used" on 21<sup>st</sup> August, 2003.



*Prof. S.P. Mehrotra*

Dr. Baldev Raj, Director, Materials Groups, IGCAR, Kalpakkam spoke on "R&D challenges in the Technology of Fast Breeder Reactors for Energy Security in the Country" on 1<sup>st</sup> September, 2003.

Dr. A. Ghosh, Formerly Professor IIT, Kanpur delivered the lecture on "Research and Development in Steel Making – My Experience" on 3<sup>rd</sup> September, 2003.



*Dr. Sanak Mishra*

Dr. Sanak Mishra, MD, Rourkela Steel Plant-Rourkela presented the lecture on "Some thoughts on Leadership and Knowledge" on 23 September, 2003.

## SPORTS NEWS CAPSULES

- Sri Manjit Singh, Tech. Asstt. has won 3<sup>rd</sup> position (singles) in the East Singhbhum District Carrom tournament held at Jamshedpur on 9<sup>th</sup> and 10<sup>th</sup> August 2003. In doubles, Sri Manjit Singh and Md. Naeem Ansari of NML became the runners up.
- Sri Manjit Singh and Sri R. Raju represented East Singhbhum District

in Carrom competition organised for the Jharkhand State Carrom Championship held at Jamshedpur on 19<sup>th</sup> and 22<sup>th</sup> August 2003.

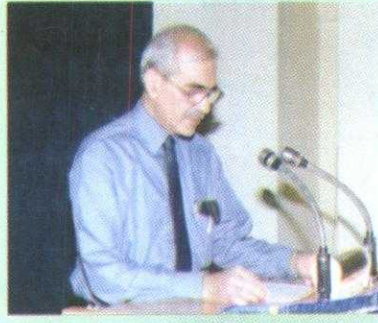
- NML team qualified for the finals in Bridge, Carrom, Chess, and Table tennis at the 36<sup>th</sup> SSBM Zonal Tournament held at IHBT, Palampur (HP) on July 3-5, 2003,



*NML team at IHBT, Palampur.*

# हिन्दी दिवस समारोह

राजभाषा कार्यान्वयन समिति के तत्वावधान में हिन्दी दिवस समारोह के अन्तर्गत राष्ट्रीय धातुकर्म प्रयोगशाला में हिन्दी को बढ़ावा देने के उद्देश्य से विभिन्न कार्यक्रमों का आयोजन किया गया। जिसके अन्तर्गत 02.09.2003 को कार्यक्रम का शुभारंभ निदेशक तथा अध्यक्ष प्रो. सूर्य प्रताप मेहरोत्रा द्वारा दीप जलाकर किया गया। दिनांक 04.09.2003 को अहिन्दी भाषियों हेतु हिन्दी श्रुत लेख प्रतियोगिता का आयोजन किया गया, जिसमें प्रयोगशाला के वैसे कर्मियों ने भाग लिया जो अहिन्दी भाषी हैं। इस कार्यक्रम में कुल 50 प्रतिभागियों ने भाग लिया। दिनांक 05.09.2003 को हिन्दी निबन्ध प्रतियोगिता का आयोजन किया गया, जो विज्ञान विषय से संबंधित था। दिनांक 08.09.2003 को प्रशासनिक शब्दावली प्रतियोगिता का आयोजन किया गया, जिसमें प्रयोगशाला के हिन्दी तथा अहिन्दी भाषी कर्मियों ने करीब 70 की संख्या में भाग लिया। इस प्रतियोगिता के अन्तर्गत हिन्दी टिप्पणियों को अंग्रेजी में, अंग्रेजी टिप्पणियों को हिन्दी में, हिन्दी शब्दों के अंग्रेजी पर्याय तथा अंग्रेजी शब्दों के हिन्दी पर्याय लिखने को दिए गए। दिनांक 09.09.2003 को जानवरों की दुनिया विषय पर एक व्याख्यान का आयोजन किया गया, जिसके व्याख्याता



प्रो. सूर्य प्रताप मेहरोत्रा, निदेशक



डॉ. श्रीकृष्ण नारंग, सचिव, न.रा.का.स.



श्री पुरुषोत्तम कुमार, हिन्दी अधिकारी

प्रो. एस. एस. रजी, प्राचार्य, वर्क्स कॉलेज, जमशेदपुर थे। दिनांक 10.09.2003 को कम्प्यूटर पर हिन्दी टंकण प्रतियोगिता का आयोजन किया गया, जिसके अंतर्गत कम्प्यूटर

पर एम.एस.वर्ड/लीप ऑफिस सॉफ्टवेयर में हिन्दी टंकण प्रतियोगिता का आयोजन किया गया। दिनांक 11.09.2003 को तनाव प्रबंधन विषय पर एक व्याख्यान का आयोजन किया गया जिसके व्याख्याता अपोलो अस्पताल, हैदराबाद के पूर्व ध्यान चिकित्सक स्वामी राजीव सत्यार्थी जी थे, इसके अंतर्गत तनाव के कारण-निवारण पर दृष्टि डाली गई साथ ही ध्यान द्वारा तनाव को सकारात्मक अभिक्रियाओं में लगाने पर बल दिया गया।

इस हिन्दी दिवस समारोह का समापन दिनांक 15.09.2003 को हुआ। इसी दिन एक हिन्दी कार्यशाला का भी आयोजन 10.30 से 03.15 तक किया गया जिसके अन्तर्गत प्रयोगशालाकर्मियों को नेमी टिप्पणी, प्रशासनिक शब्दावली, तकनीकी शब्दावली, परिपत्र, कार्यालय आदेश, मसौदा लेखन, हिन्दी वर्तनी का मानकीकरण एवं सामान्य तथा अर्द्धसरकारी पत्र लेखन की जानकारी दी गयी। इसी दिन 03.30 बजे हिन्दी दिवस समापन समारोह का आयोजन किया गया जिसमें सभी सफल प्रतिभागियों को पुरस्कार प्रदान किया गया। पन्द्रह दिनों तक चलने वाले हिन्दी समारोह ने सभी प्रयोगशालाकर्मियों में नयी चेतना का संचार किया और राजभाषा हिन्दी के प्रति गहरी रुचि पैदा की।

## Wishing a Happy Retired Life

Shri B.Toppo, JSA; Dr. S.C. Srivastava, Gr.IV(5); Shri P.R. Sastry, Gr.III(6); Shri R.D. Singh, Gr.II(5); Shri Swanabal, Gr.I(4); Shri N.C.Mahato, Gr.II(4); Shri Kisto Behra, Gr.I(4); Shri Gugul Sinha, Gr.II(4).

## Independence Day celebrations

Independence Day was celebrated on 15 August, 2003 by hoisting the National Flag by Prof. S.P. Mehrotra, Director at NML premises. Mrs. Archana Mehrotra, hoisted the Flag at NML Agrico Flats campus and NML Tuiladungri Colony. A colourful cultural programme was also presented by the children of the staff club members at NML Auditorium. Drawing competition and essay competition were organized on this occasion by the staff club.