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Dr. Harsh Vardhan inaugurates the "MAGIC" process lab at CSIR-National Chemical Laboratory, Pune

The Union Minister for Science & Technology & Earth Sciences, Dr Harsh Vardhan, inaugurated a unique MAGIC [Modular, Agile, Intensified & Continuous] Process Lab at CSIR-National Chemical Laboratory (CSIR-NCL) Pune last evening. While inaugurating the facility he announced that "The MAGIC processes and plants will bring about a paradigm shift in the way in which India's Fine and Specialty Chemicals industry will operate in the future. Over the past three decades, the global fine and specialty chemicals industry has shifted manufacturing base from the western world to countries like India and China. The MAGIC processes developed in CSIR-NCL can radically change currently practiced process technologies into modern processes that are cleaner, greener, safer, compact, scalable and economical. As a result, the MAGIC processes have the potential to transform the country into a global powerhouse in this important sector, thus enabling the country to increase its contribution to global production of chemicals from the current levels of 3 to 5% over the next few years." He consequently called upon the Indian chemical Industry to work closely with this National facility to realize this goal.

Dr Harsh Vardhan interacted with the leadership of CSIR-NCL in the morning. Dr. Girish Sahani, DG-CSIR initially briefed the Minister of all the new programmes initiated by the CSIR for the benefit of the country. Welcoming the Hon'ble Minister, Dr Vijayamohanan, Director, CSIR-NCL, said that CSIR-NCL is strongly committed to using its strengths in sciences and engineering to deliver impact making technologies. Giving a brief overview of the history since its inception in 1950 and some of the recent achievements of the laboratory, Dr. Vivek Ranade, Deputy Director, CSIR-NCL mentioned that the focus of CSIR-NCL is to explore chemical and related sciences at the most fundamental level while at the same time it will continue to translate new and known science innovatively to applications in industry and society.

While addressing the staff at CSIR-NCL, Dr Harsh Vardhan commended CSIR-NCL's efforts in providing effective solutions to key problems of national relevance. He extolled the laboratory for its enormous contributions to the growth of Indian chemical and allied industries in the areas of dyestuff, agrochemicals, pesticides, pharmaceuticals, fine and specialty chemicals, catalyst and tissue culture. He further added that the laboratory has set global standards by licensing patents and technologies to large multinational companies such as General Electric, Sabic, Solvay, DuPont and Celanese. He lauded CSIR-NCL's performance in consistently filing the largest number of patents among all Indian academic and industrial R&D organizations, and publishing the second largest number of papers in peer reviewed international scientific journals of repute in the country. However, the Minister cautioned the CSIR-NCL staff by saying that though past contributions are important, scientists should constantly endeavor to think out-of-the-box and innovate. He emphasized that scientists should pursue new research areas which could meet the country's needs as well as put her ahead in selected technology domains.

The exhibition in the MAGIC Lab displayed the products and processes developed under the MAGIC program. The Minister saw various chemical products and processes for key reactions like nitration, diazotization, alkylation, esterification and hydrogenation carried out in the MAGIC reactors. Many of these processes have been translated to industry and are at various stages of commercialization. This would lead to significant benefits for small and medium scale chemical industries across India in terms of profitability and environmental impact. The products developed under the MAGIC program such as intensified metallic reactors (commercialized by Amar Equipment), tubular glass lined reactors (developed in collaboration with GMM Pfaunder) and reaction calorimeter were also displayed. The Minister lauded these efforts as being truly globally competitive and reflecting Government's 'Make in India' and 'Innovate India' spirit.

The Minister also visited stalls that exhibited industrial scale process technologies developed and licensed by CSIR-NCL. These included MAGIC lab, ENSEL technology, a globally competitive technology for manufacturing biodiesel using heterogeneous catalyst which has been licensed to Benefuel LLC (an American company). The recipient of CSIR Technology Award of 2015, ENSEL is CSIR-NCL's breakthrough double-edged technology for transesterification of seed

oils and etherification of glycerin. Another technology on display was a low pressure process for manufacturing para-amino phenol, a key ingredient of the generic drug, paracetamol. A new and first of its kind unique process for dimethyl carbonate using a homogenous catalyst developed under the NMITLI (new millennium Indian technology leadership initiative) program of CSIR in collaboration with IIT Mumbai and Deepak Fertilizers and Petrochemicals Ltd (DFPCL) was also on display.

In the exhibition set up at the Polymers and Advanced Materials Laboratory, Dr. Harsh Vardhan witnessed a live demonstration of indigenously developed 1 kW Polymer Electrolyte Membrane Fuel Cell (PEMFC) system, a clean energy generation device developed by CSIR in partnership with industry for applications in back-up power supply for telecom towers (with Reliance Industry Ltd), residential and small office spaces (with Thermax) and transportation sector (with KPIT and TVS Motors). He remarked that the PEMFC technology is in line with India's commitment to the recently concluded COP21 Paris agreement and that licensing of technology for making components of PEMFC to SMEs is in the true spirit of Prime Minister's 'Make in India' initiative.

Dr. Harsh Vardhan showed special interest in the stall that displayed CSIR-NCL's contributions to the area of affordable healthcare such as development of life saving drugs Amlodipine besylate and Asomex, which have been commercialized by Emcure, development of porous polyethylene implants for reconstructive surgery of maxillofacial bones, which is commercialized by BioPore Surgicals, development of novel resorbable silk-based bone graft implants, bone fixation screws and membrane based oxygen-enriched air generation system, which are licensed to start-up companies created by CSIR-NCL scientists, and the novel expandable biliary stents being developed in collaboration with a biotech start-up company.

Dr. Harsh Vardhan lauded CSIR-NCL's efforts in developing ultrafiltration based water purification technologies for making affordable potable water, which have been licensed to Membrane Filters India Ltd and Technorbital Pvt. Ltd. He showed special interest in 'Jaldoot' which supply potable water at the doorsteps of houses in many villages in Maharashtra. It also delivered potable water to villages hit by natural calamities such as the devastating cyclone in Orissa in November 1999, earth-quake affected areas in Gujarat, floods and landslides in Uttarakhand in 2014 and floods in Chennai in 2015.

Dr Harsh Vardhan also visited the stall showing CSIR-NCL's efforts in skill development and outreach activities. The laboratory offers 80 PhD degrees every year in important research areas such as healthcare, energy, drinking water, environment, crop and nutrition and strategic sectors. CSIR-NCL also offers specialized technical training programs to industry personnel. The laboratory has trained as many as 2000 young engineers and scientists working in areas of polyolefins, engineering plastics, fine and specialty chemicals, etc. The Minister praised CSIR-NCL's outreach activities through its Exciting Science Group in which scientists from the laboratory interact with students from Government and Municipal schools and demonstrate to them how chemistry is important in every walk of life. The goal of this activity is to nurture a spirit of inquiry, creativity and love for Science and Mathematics among school children, which is in sync with the goals of the "Rashtriya Avishkar Abhiyan". Some of the school students who were mentored by scientists and research students of CSIR-NCL have gone on to win prizes in various Olympiads and National Science Fairs.

Dr Harsh Vardhan appreciated the activities of Venture Center, which is CSIR-NCL's technology business incubator. NCL was the first CSIR laboratory to establish an incubation center for creating and nurturing start-up companies. NCL Venture Center is today India's largest scientific business incubator with 36 start-up companies housed in its facilities. The Minister remarked that translation of NCL's science through entrepreneurial ventures is an excellent example of the Prime Minister's recently launched 'Start-Up India' initiative. He hoped that CSIR-NCL and NCL Venture Center can together enable and hand hold 'Start-Up India' movement in CSIR and elsewhere.

The Minister reviewed the activities of CSIR's Unit for Research and Development of Information Products (CSIR-URDIP) and expressed the happiness on the progress made in the area of patent Informatics and felt that each scientific agency should make use of patent informatics for picking the winners from portfolio of R&D projects. He was happy to see the use of modern computational and analytical tools to drive the drug discovery from leads obtained through traditional knowledge. He appreciated the information infrastructure being created by CSIR-URDIP through repositories and portals which help to establish research communities and networks. He lauded the spirit of Intrapreneurship prevailing in the institute.

CSIR - National Chemical Laboratory (<http://www.ncl-india.org>), Pune India is a research, development and consulting organization with a focus on chemicals and materials. It has a successful record of research partnership with industry. NCL is a flagship laboratory of the Council of Scientific & Industrial Research (CSIR, <http://www.csir.res.in>) which is the largest network of publicly funded research institute in India. The NCL Venture Center (www.venturecenter.co.in) is a non-profit technology business incubator hosted by the National Chemical Laboratory, Pune, India.

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