

# A reaction to chemistry's changing needs

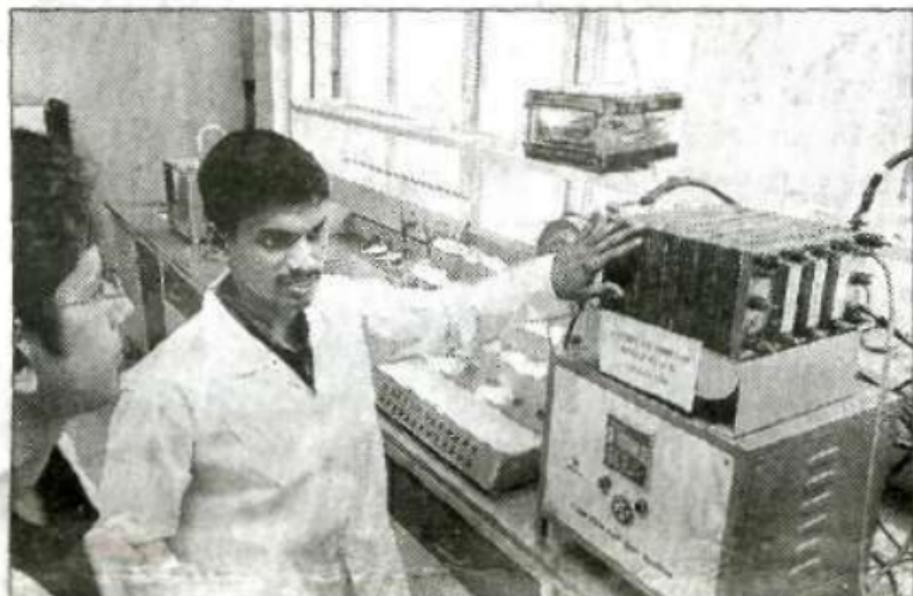
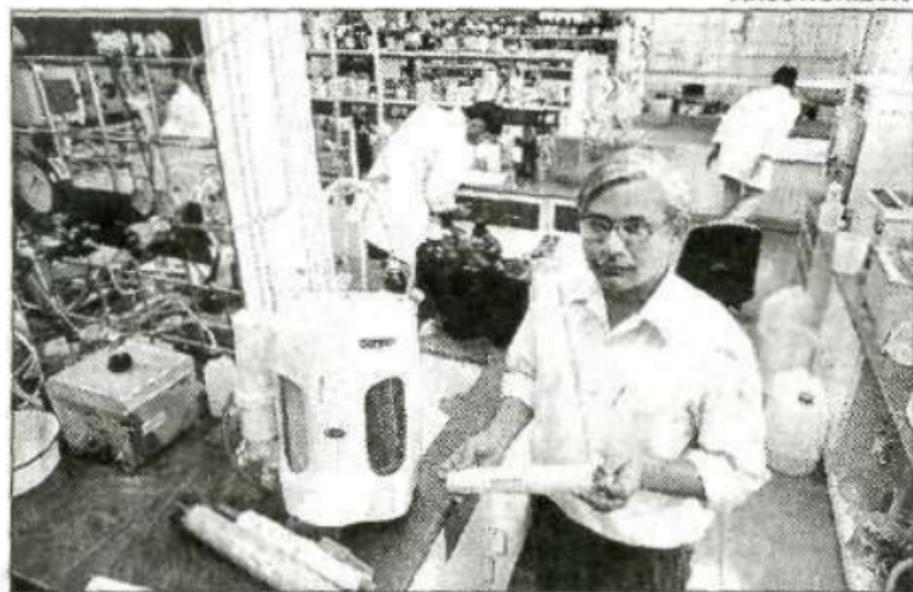
In keeping with the times, the National Chemical Laboratory in Pune is focusing on polymer science and renewable energy

ARUNJAYAN

THE National Chemical Laboratory (NCL) in Pune, inaugurated by former Prime Minister Jawaharlal Nehru in 1950, has changed with the times—from a centre of research in organic chemistry in the 1960s to a centre for excellence in polymer science and catalytic processes today. This month, NCL unveiled the Rs 18 crore Diamond Jubilee Polymers and Advanced Materials Laboratory, which will house various facilities dealing with organic, inorganic and polymeric materials.

"Themes that are relevant to NCL now are advanced and functional materials, hybrid materials, bio-inspired materials, synthetic biology, bio-resource technologies, bio-transformation, bioactive molecules, catalytic processes, scientific computing across multiple length and time scales, etc. These themes will demand more interdisciplinary research with larger interface between

ARUL HORIZON



**A prototype of the fuel cell; (top) NCL scientist Ulhas K Kharul in the Polymer Science and Engineering Division lab with the UF membrane filter**

chemistry, biology, material science and engineering," said Dr S. Sivaram, director, NCL.

An ultra-filtration-based membrane developed by the Polymer Science and Engineering Division for water purification—it can remove bacteria and viruses—has been successfully tested in rural environments in earthquake-affected areas in Gujarat. "The UF membrane is a thin film whose small pores serve as physical barriers preventing the passage of impurities. It can completely remove viruses and bacteria from water. It is so fine that only the tiniest of molecules pass through it. Larger molecules, viruses and bacteria, remain on the surface of the membrane," said senior scientist Dr Ulhas K Kharul. Units installed in Orissa, tested by National Environmental Engineering Research Institute, proved effective in significantly reducing the microbial count.

With the Union Government laying the roadmap for the National Hydrogen Energy Programme in 2006, which aims to put one million hydrogen-fuelled vehicles on Indian roads and create 1,000 MW aggregate capacity for decentralised hydrogen-based generation by 2020, NCL is exploring alternative energy sources.

Research in this field has given birth to a fuel cell, a prototype of which is ready for testing at NCL. Fuel cells are electrochemical devices which convert chemical energy directly into electrical energy using hydrogen and oxygen. They can be put to use in automobiles, mobile phones or laptops, and also in power units to generate electricity. Reliance Industries Ltd is partnering with NCL and other CSIR laboratories (CECRI, Karaikudi and NPL, New Delhi) to further develop and deploy this technology.