From the Editor's Desk

We are bringing out this issue on "Catalysis at Interface" edited by Professors M S Hegde and S Vasudevan. Incidentally this area has flourished in recent times and many new appreciations have been realized. As can be seen by the articles there are significant studies towards the design for auto exhaust catalyst, hydrogen generation and solutions to environmental problems. The members of the editorial board take pride in bringing this issue and we thank all the contributors and the efforts put by Professor M S Hegde and Professor S Vasudevan in getting a variety of articles together.

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Editorial

Chemistry at the Interface

Heterogeneous catalysis, in which the catalyst exists in a different phase from the reactants, currently accounts for 80 to 85 percent of all chemical manufacturing processes. Heterogeneous catalysis is an interfacial phenomenon wherein both solid state and surface structures play important roles. The catalysts are usually inorganic solids while the reactants mostly organic. In spite of (some) amazing practical successes, only modest progress had been made in scientific elucidation of the working mechanism and the basic nature and molecular mechanisms of catalytic action. Heterogeneous catalysis remained essentially an empirical science, far-removed from the more exacting and rigorous surface science practiced on atomically clean well-defined surfaces. Complexity of the problem coupled with the absence of suitable techniques was the obstacle to gaining a deeper understanding of molecular nature of a catalytic reaction. The scenario has, however, changed dramatically in the last two decades with the introduction of new and powerful techniques. There has been a renaissance in the field that has now been recognized as an interdisciplinary area that demands cooperation of experts from a multitude of traditional branches of natural and engineering sciences. Solid-state chemistry and physics, materials and surface science have all contributed to an improved understanding of heterogeneous catalysis. Contributions of other disciplines-reaction kinetics and mechanisms, theoretical chemistry, solid-state spectroscopy, analytical chemistry and chemical reaction engineering have also steadily increased. It is this pronounced interdisciplinary nature that contributes to the fascination of heterogeneous catalysis. In addition to the challenge of deciphering the molecular nature of heterogeneous catalysis, there are new challenges for the 21st century — the increasing demand for clean and safe energy and the development of new catalysts to address environmental concerns.

This issue provides a flavor of the current research activity in heterogeneous catalysis in the country. The topics include catalyst design, reactions, characterization and spectroscopy, and also summarizes the current efforts in the areas of Hydrogen generation, auto-exhaust catalysis and environmental remediation.

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