In this issue

Surface roughness and monolayers

The effect of surface roughness on the assembly of octadecanethiol monolayer on noble metal surfaces has been probed by R. Subramanian and V. Lakshminarayanan (**page 665**). The authors say that the 'results clearly establish for the first time that there exists a direct correlation between the surface roughness and barrier efficiency' in the oxidation behaviour of noble metals like gold, silver and copper. They also believe that the methodology adopted will contribute to a better understanding of the role of surface roughness on the barrier properties of self-assembled monolayers. The paper deals with adsorption of octadecanethiol on surfaces which have been subjected to various pretreatments like polishing with different grade emery and alumina. The nature and density of defect sites generated have been monitored and it has been reported that smooth alumina polished surface has a number of closely spaced corrugates compared to other surfaces polished using coarse emery. This blocking of noble metals by the self-assembled monolayers of octadecanethiol has been monitored by cyclic voltammetry.

In addition to the conventional deductions regarding the identification of possible redox processes in the case of noble metal systems, there is an interesting observation reported in this paper. This pertains to the semi-quantitative evaluation of the barrier effect caused by the self-assembled monolayers of octadecanethiol on the oxidation of noble metal as well as the determination of fractional coverage of the adsorption of octadecanethiol from the determination of the integrated charges from cyclic voltammetric traces. The new result of this paper is the observation that the defects are predominantly formed on the surface corrugation regions and that these are present in large number on alumina-polished surfaces. The paper will be of interest to electrochemists as well as for applied material scientists.

B. Viswanathan

Mathematics and physicist's conception of nature

On **page 634**, N. Mukunda's lecture on 'Mathematics and the physicist's conception of nature' goes over questions that have been raised time and again by practitioners and followers of both disciplines. Does mathematics have to be inspired by efforts to understand the external world, as much as early work like that of Pythagoras was? Is there a world of mathematical concepts and results which mathematicians explore and uncover, or are they created in the same sense as art is? Especially on the very large and very small scales, far removed from our everyday experience, isn't the mathematics more stable and reliable than the physical interpretation? And finally, what was the role of our ability to do mathematics, (pure or applied) in our biological survival? These and related issues are discussed with a variety of examples from physics and some from mathematics.

R. Nityananda

Plant defenses

The mechanisms by which plants acquire resistance to infection by invading micro-organisms are dramatically different from the strategies adopted by the immune system in mammals. Considerable progress has been made in recent years in understanding the molecular basis of the induction and maintenance of resistance in plants. Critical roles have been ascribed to the extremely simple molecule, salicyclic acid, and a number of proteins that appear to be induced by pathogen infection. H. Shekar Shetty and Vasanthi U. Kumar (**page 640**) review the area of 'plant immunity', emphasizing the diverse modes by which resistance appears to be conferred. Systemic acquired resistance is of particular interest because of the implicit 'memory effect'. There are interesting parallels to be drawn and differences to be highlighted between defense responses in plants and animals.

P. Balaram