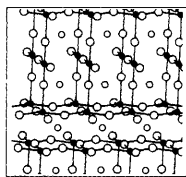


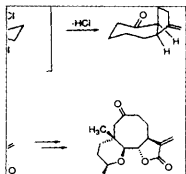
# Chemical Society Reviews

Volume 24 Issue 1 Pages 1-78 February 1995



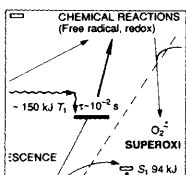
## Structure-Property Relationships in Superconducting Cuprates By C. N. R. Rao and A.K. Ganguli (pp. 1-7)

An examination of the structure and superconducting properties of the various families of cuprates suggests several interesting structural commonalities. Relations between some of the structural parameters of the cuprates and the superconducting transition temperature,  $T_c$ , provide useful insights. Variations of  $T_c$  on the hole concentration, the in-plane Cu-O and the apical Cu-O distances, as well as the Madelung potentials and bond valence sums are particularly noteworthy. The Cu-O charge-transfer energy appears to be fundamental in determining the properties of cuprates.



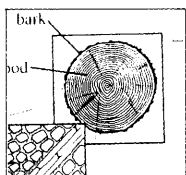
## CENTENARY LECTURE. Bridgehead Unsaturation in Compounds of Nature: A Proper Forum for Unleashing the Potential of Organic Synthesis By Leo A. Paquette (pp. 9-17)

The inherent structural complexity and biochemical functions of naturally occurring bridgehead olefins have aroused widespread interest in their synthesis. [3,3] Sigmatropy is shown to be especially conducive to the introduction of bridgehead double bonds under full regiochemical control. This highly utilitarian feature is illustrated in a number of different contexts including a biogenetic-like enantioselective synthesis of vulgarolide, an approach to furanoheliangolide construction, a means for rapid construction of the ABC subunit of the insect kairomone cerorubenic acid-III, a strategy for elaboration of the structural complex cytotoxic agent O-methylshikocin, a basis for elaborating several structurally related 8,9-seco-*ent*-kaurenes, a projected dual synthesis of taxusin and taxol, and an enantioselective pathway to (+)-cleomeolide.



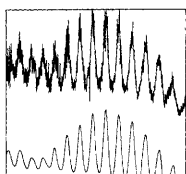
## Photosensitizers of the Porphyrin and Phthalocyanine Series for Photodynamic Therapy By Raymond Bonnett (pp. 19-33)

Tumour phototherapy involves the preferential destruction of tumour cells by a combination of photosensitizer, light, and oxygen (photodynamic therapy). The origins of this topic are considered, as are mechanistic aspects. The review then concentrates on current efforts to discover photosensitizers which are more potent and more selective than the first generation materials (Haematoporphyrin Derivative and its commercial variants). Design features are summarized, and recent work on sensitizers of the porphyrin, chlorin, phthalocyanine, naphthalocyanine, porphycene, and texaphyrin classes are discussed in relation to our own work on m-THPC (Temoporfin).



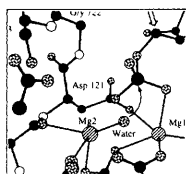
## Conservation of Waterlogged Archaeological Wood By Barry Kaye (pp. 35-43)

A stroll round a museum is relaxing, but within the display cabinets lurk artefacts of considerable chemical and physical complexity. It is the conservators job to stabilize these, and make them suitable for display and study in perpetuity. One of the most difficult and time consuming materials to treat is waterlogged wood. Here the origin, and some of the solutions, to the problems posed by its conservation are reviewed.



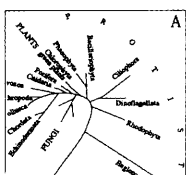
## Potential Surfaces and Dynamics of Weakly Bound Trimers: Perspectives from High Resolution IR Spectroscopy By Martin A. Suhm and David J. Nesbitt (pp. 45-54)

Forces between molecules are dominantly, but not exclusively pairwise additive. For several types of interaction, three-body forces contribute importantly. Infrared spectroscopy of weakly bound trimers provides direct insight into the structural and dynamical implications of these three-body forces. This is illustrated for the homologous series  $(\text{HF})_3 - \text{Ar}(\text{HF})_2 - \text{Ar}_2\text{HF} - \text{Ar}_3$ , which covers a wide range of intermolecular interaction mechanisms such as hydrogen bonding, electrostatics, polarization, dispersion, and Pauli exclusion.



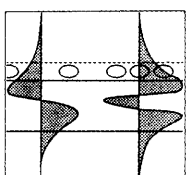
## Stereochemical, Mechanistic, and Structural Features of Enzyme-catalysed Phosphate Monoester Hydrolyses By David Gani and John Wilkie (pp. 55-63)

Phosphoryl transfer is intimately involved at all levels of cellular control. This short review summarizes and highlights our understanding of the chemistry of phosphate monoester hydrolyses in a wide range of different enzymic systems. The article draws attention to the similarities and differences in the diverse array of mechanisms that are employed by Nature in mediating phosphate ester hydrolysis and identifies trends that are related to the substrate specificity of phosphatases.



## Structurally Similar Natural Products in Phylogenetically Distant Marine Organisms, and a Comparison with Terrestrial Species By Francesco Pietra (pp. 65-71)

Phylogenies are classically deduced from the examination of genetic material or the encoded proteins. The place of secondary metabolites in such inferences is questioned and viewed to be relevant at short evolutionary distances. But the main concern of the author is when the same secondary metabolite (usually with a different function) occurs in phylogenetically distant marine organisms. Such instances are documented, with terrestrial comparisons, and (bold) conclusions are drawn about how these secondary-metabolite-producing organisms evolved.



## Puzzles and Paradoxes in Protein Adsorption By J. J. Ramsden (pp. 73-78)

Protein adsorption at the solid-liquid interface impinges onto a host of industrial processes (including the purification, analysis, and storage of pharmaceutical products), the biocompatibility of surgical implants, as well as fundamental biochemical processes. Present knowledge in the field is largely empirical, which is hindering process optimization and the design of new materials. This situation is changing rapidly, however, thanks to the development of new, precise experimental techniques paralleled by significant theoretical advances.

## ***Articles that will appear in forthcoming issues include***

Synthesis of Diarylketones through Carbonylative Coupling **J.-J. Brunet and R. Chauvin**

Transannular Interactions in Difunctional Medium Rings – Modelling Bimolecular Reactions **P. Rademacher**

Metal–Metal Interactions in Binuclear Complexes Exhibiting Mixed Valency: Molecular Wires and Switches **M. D. Ward**

New Strategies for Probing Crystal Dissolution Kinetics at the Microscopic Level **P. R. Unwin and J. V. Macpherson**

The Emerging Chemistry of Polynuclear Metal Hydrido Alkoxides:  $H_x M_y (OR)_z$  **M. H. Chisholm FRS**

Infrared Laser and Microwave Spectroscopy of Electric Discharges **P. B. Davies**

Kinetic Studies of Alcohol–Surfactant Mixed Micelles **R. E. Verrall**

Coordination Chemistry of Phosphorus(III) and Phosphorus(V) Hydrazides **K. V. Katti, V. S. Reddy, and P. R. Singh**

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