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Chemical Society Reviews

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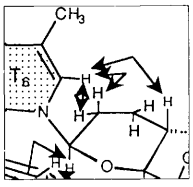
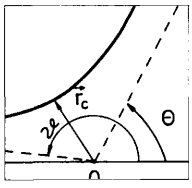


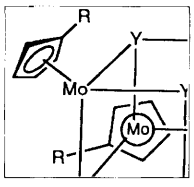
Chemistry of Potentially Prebiological Natural Products *By Albert Eschenmoser and Eli Loewenthal* (pp.1–16)

The demonstration that biologically relevant molecules can be generated *non-enzymically* from precursors as simple as hydrogen cyanide, and found in interstellar space, identifies *possible* pathways for the molecular mechanisms of the origin of life. The reason why Nature uses pentoses in nucleic acids and not hexoses can be understood by comparing the properties of 'homo-DNA' oligonucleotides derived from *e.g.* 2′,3′-dideoxyallose with those of DNA oligonucleotides from deoxyribose.



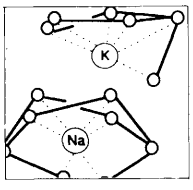
The Theory of Atomic and Molecular Collisions *By John N. Murrell and S. Danko Bosanac* (pp.17–28)

The inter atom/molecule potential governs molecular behaviour over a vast range from physical properties in bulk phase to intrinsic chemical reactivity. Scattering data from collisions in crossed beam experiments provide the most important probes of such potentials. The classical, semi-classical, and quantum mechanical theories available to analyse the data from elastic, inelastic, and reactive scattering processes are reviewed.



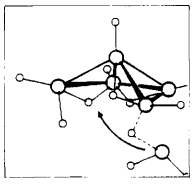
Cyclopentadienyl Molybdenum and Tungsten Dihalides *By Malcolm L. H. Green and Philip Mountford* (pp.29–38)

Two alternative structures observed for binuclear cyclopentadienyl molybdenum or tungsten dihalides, one with a metal–metal single bond, the other with a triple bond, illustrate 'a delicate balance between metal–metal and metal–ligand bonding'. The 'rich and diverse reaction chemistry' of these complexes is illustrated with reference to the structural type and nature of the halide.



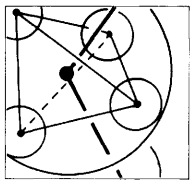
Lariat Ethers: From Simple Sidearms to Supramolecular Systems *By George W. Gokel* (pp.39–47)

This review constitutes a highly personal account by Professor Gokel of crown ethers having side-arms – or lariat ethers, as the author has imaginatively dubbed them. He describes how the first systems, built up of single arms containing donor groups, have evolved into much more extensive molecular arrays capable of exhibiting self-assembly at a supramolecular level under appropriate conditions.



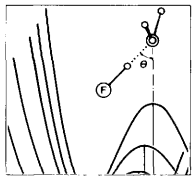
LUDWIG MOND LECTURE. Taking Stock: The Astonishing Development of Boron Hydride Cluster Chemistry *By Norman N. Greenwood* (pp.49–57)

In his review lecture, Professor Greenwood highlights the two major intellectual puzzles and challenges of polyhedral borane chemistry – he traces the mechanisms and reactions by which boron hydride clusters interconvert and grow by reference to the gas-phase thermolysis of B_2H_6, B_4H_{10}, B_5H_{11}, and B_6H_{12} and he outlines how the simple idea that one, two, or even more metal centres might be incorporated as 'honorary boron atoms' into the polyhedral clusters turned out to be extremely fruitful in the field of borane cluster chemistry.



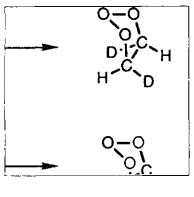
The VSEPR Model Revisited *By Ronald J. Gillespie* (pp.59–69)

The simplest and most powerful qualitative approach to the description and prediction of molecular geometries is VSEPR (Valence Shell Electron Pair Repulsion) Theory. Since it was proposed some thirty years ago the original ideas have been reformulated, a deeper understanding of the physical basis has been developed and its range of applicability has been extended. The theory is here summarized in the light of these refinements.



The Nature of the Hydrogen Bond to Water in the Gas Phase *By A. C. Legon and D. J. Millen* (pp.71–78)

The most fascinating and important weak intermolecular interaction is the hydrogen bond in water. It holds the key to the idiosyncratic behaviour of liquid water and dominates the chemistry of living systems. Recent advances in high resolution spectroscopy in the gas phase have enabled the intrinsic properties of this bond to be obtained by detailed study of a range of water-containing dimers ($H_2O{\cdot}HX$). The results of such studies are assessed and, in particular, questions relating to the proton donor/acceptor behaviour of water are discussed as are the factors governing dimer structure and the tendency for water to form protonated complexes.



The Structure and Mechanism of Formation of Ozonides *By Robert L. Kuczkowski* (pp.79–83)

This review article explores several questions of current interest surrounding the three key steps in the Criegee mechanism which involves a primary ozonide – or so-called molozonide – and a carbonyl oxide as intermediates. The question of whether the cycloadditions and the cycloreversion involving these elusive intermediates are concerted mechanisms is addressed by Professor Kuczkowski with varying degrees of confidence by reference to the results obtained using physical organic techniques, including spectroscopy, kinetic isotope effects, and theoretical approaches.

Articles that will appear in forthcoming issues include

Modern Liquid Chromatography **R. P. W. Scott**

Artemisinin (Quinghaosu): A New Type of Anti-malarial Drug **A. R. Butler and Yu-Lin Wu**

Calculating Molecular Spectra **J. Tennyson and S. Miller**

Transmetallation Mechanisms and Applications **M. G. Davies, M. A. El-Sayed, and A. El-Toukhy**

Bridgehead Radicals **J. C. Walton**

RHÔNE-POULENC LECTURE. Medicinal Chemistry of Taxus Alkaloids **P. Potier**

Structure, Dynamics, and Electronic Properties of Cobaltocene in $SnS_{2-x}Se_x$ **D. O'Hare**

Surfactant Interactions with Biomembranes and Proteins **M. N. Jones**

The Construction of a Molecular Lego Set **J. F. Stoddart**

Solvatochromism, Thermochromism, Piezochromism, Halochromism, and Chiro-Solvatochromism of Pyridinium N-Phenoxide Betaine Dyes **C. Reichardt**

Molecular Dynamics Simulations of Surface Chemical Reactions **B. J. Garrison**

Magic Numbers in Molecular Clusters: A Probe for Chemical Reactivity **M. T. Coolbaugh and J. F. Garvey**

Binuclear Iron Centres in Proteins **R. G. Wilkins**

Ruthenium Oxo Complexes as Organic Oxidants **W. P. Griffith**

Molecular Fluorescent Signalling with 'Fluor–Spacer–Receptor' Systems: Approaches to Sensing and Switching Devices *via* Supramolecular Photophysis **A. P. de Silva** *et al.*

Electrochemical Aspects of STM and Related Techniques **P. A. Christensen**

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Editorial

Harold Kroto: Chairman of the Editorial Board

The style of the articles to be published in *Chemical Society Reviews* and the presentation format have been revised to reflect the new role which the journal will play in the future. An intrinsic interdisciplinary attitude to research is seen as the most important prerequisite to scientific advance and this philosophy will be the guide to future editorial policy. The journal will also reflect the exciting new wind of international scientific collaboration which recent events promise.

It is intended that each issue will contain several reviews of interest to any member of the international chemistry community. The reviews are to provide introductions to timely and promising areas so that their importance can be readily and efficiently comprehended and likely applications to adjacent fields recognized. The references are to be limited to those which were important in establishing the field together with some carefully chosen for their value for basic understanding and others to guide the reader who needs further specialized information to obtain it quickly and efficiently. It is hoped that not only will the research horizons of senior research scientists be extended, but graduate and undergraduate students will find the articles particularly valuable in building up the solid chemical background necessary at the start of a career in chemistry.

In general authors are asked to place any of their own work cited in the wider context of the field as a whole. The journal will continue, occasionally, to publish articles by winners of Royal Society of Chemistry awards.