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Chemical Society Reviews

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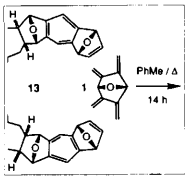
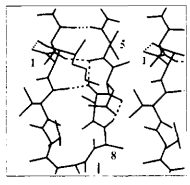


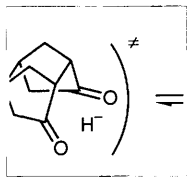
Constructing a Molecular LEGO Set *By John P. Mathias and J. Fraser Stoddart* (pp. 215–225)

This review article on substrate-directed synthesis, which has been written unconventionally in carefully designated and supporting parts by supervisor (JFS) and student (JPM), describes the events surrounding the controlled, stepwise construction of molecular waves, belts, and cages using repetitive, highly diastereoselective Diels–Alder reactions that occur under kinetic control. This kind of approach to the self-assembly of cyclacene and polyacene derivatives could have important implications for the development of nanochemistry in terms of new organic materials with prescribed functions as well as predetermined forms.



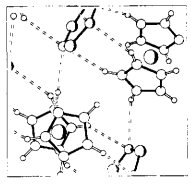
Peptide Structure from NMR *By Michael P. Williamson and Jonathan P. Waltho* (pp. 227–236)

This review describes the parameters available for characterizing peptide structure by NMR, and goes on to consider how these parameters are applied, choosing contrasting examples for detailed study. The review concentrates on how conformations of mobile peptides may be derived, particularly where there are several conformations in fast exchange. We also discuss ways of obtaining conformational information on receptor-bound peptides.



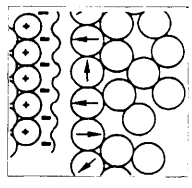
Ion Pairing and Reactivity of Alkali Metal Alkoxides *By K. J. Msayib and C. I. F. Watt* (pp. 237–243)

Some properties and reactions of alkoxides of relatively simple alcohols are examined, with a view to re-emphasizing the importance of taking ion-pairing into account in considerations of their reactivity. Measurements of ion-pairing and aggregation in solution are first discussed, then selected examples of inter- and intra-molecular reactions. Where possible, solution behaviour is compared with that in the gas phase where ion properties are determined solely by their molecular structure, momentum, and vibronic state.



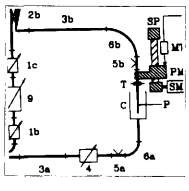
Caged Explosives: Metal-Stabilized Chalcogen Nitrides *By Paul F. Kelly, Alexandra M. Z. Slawin, David J. Williams, and J. Derek Woollins* (pp. 245–252)

The preparation and structures of metalla–sulfur–nitrogen continue to provoke keen interest. This review highlights recent developments as well as describing recent work in Se–N and Te–N chemistry.



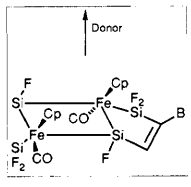
Individual Solvated Ion Properties and Specificity of Ion Adsorption Effects in Processes at Electrodes *By B. E. Conway* (pp. 253–270)

Adsorption of ions at charged electrode interfaces depends strongly on the properties of individual solvated ions in solution and on the electrode metal. This specificity arises particularly with anions, and hydrophobic organic cations and anions. Generally, the hierarchy of strengths of ion adsorption at electrodes depends complementarily on the ionic radius, polarizability, donicity, energy of solvation, and coordination geometry of the ion. These factors also determine, in important ways, the kinetics of anodic and cathodic electrode processes.



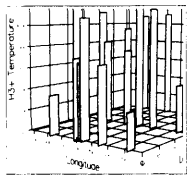
Dielectric Permittivity and Relaxation of Electrolyte Solutions and their Solvents *By J. Barthel and R. Buchner* (pp. 263–270)

This article concerns the application of dielectric relaxation spectroscopy to solution chemistry. After an introduction to the basic principles linking permittivity spectra to response functions and their relaxation times, a survey is given of experimental techniques and the problems peculiar to the investigation of liquids and solutions. Typical results of dielectric relaxation studies on electrolyte solutions and their solvents are presented, giving information about the competition between solvent–solvent and solvent–solute interactions. Effective solvation numbers can be compared to results from other methods. A solute relaxation process is typical for the formation of ion pairs and yields information on the species formed and on the rate constants of ion association.



Transition Metal Complexes of Silylenes, Silenes, Disilenes, and Related Species *By Paul D. Lickiss* (pp. 271–279)

The chemistry of compounds containing multiple bonds to silicon has increased rapidly in the last ten years but it is only recently that transition metal complexes of such species have been prepared. The synthetic routes to these complexes by addition of a free multiply bonded compound to a suitable transition metal complex and by formation of a multiply bonded ligand within the coordination sphere of a metal are discussed and compared. The structures and the spectroscopic properties of these novel complexes are also reviewed and some comparisons with the very extensive chemistry of their carbon analogues are made.



H_3^+ in Space *By Steven Miller and Jonathan Tennyson* (pp. 281–288)

H_3^+, the simplest triatomic molecule, has been the subject of a great deal of interest by laboratory spectroscopists and theoretical chemists. In the past few years, however, it has taken on a new importance as an astronomical probe, following its detection in the atmosphere of Jupiter. This article explains some of the challenges posed by H_3^+ to spectroscopists and theorists alike and shows how it has given infrared astronomers a new insight into planetary atmospheres. Conditions for detecting H_3^+ in the interstellar medium – the vast gas clouds that lie between the stars – are also discussed.

1992 Indexes (pp. 289–290)

Articles that will appear in forthcoming issues include

Zero Oxidation State Compounds of Scandium, Yttrium, and the Lanthanides **F. G. N. Cloke**

Motion of Sorbed Gases in Polymers **W.-Y. Wen**

Thermodynamic and Related Studies of Amphiphile + Water Systems **M. I. Davis**

Selectivity and Mechanism in Catalytic Asymmetric Synthesis **J. M. Brown**

HUMPHRY DAVY LECTURE. Halides Magnetic, Halides Superconducting **P. Day**

NMR of Nature's Plastics and Spiders' Webs: Chemistry, Physics, or Biology? **J. K. M. Sanders**

On the Photo-oxygenation of Olefins and the Intermediacy of Zwitterionic Peroxides. Mechanisms and Synthetic Implications **C. W. Jefford**

The Study of Surfactant Monolayers by Surface Pressure/Area Measurement **M. S. Aston**

Bond Cleavage Energies for Molecules and their Associated Radical Ions **E. M. Arnett and R. A. Flowers, II**

Measurement, Analysis, and Utility of Excess Molar $-(\partial V/\partial p)_S$ **G. Douhéret and M. I. Davis**

The Role of NMR in Boron Chemistry **D. Reed**

MELDOLA LECTURE. Reactions of Group 13 Alkyls with Dioxygen and Elemental Chalcogens: From Carelessness to Chemistry **A. R. Barron**

The Solubility of Gases in Water–Alcohol Mixtures **R. W. Cargill**

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Editorial

Harold Kroto: Chairman of the Editorial Board

This year the format and the style of *Chemical Society Reviews* was revised in order more appropriately to reflect the needs of the Chemistry Community for a useful overview of the general scientific advances being made as the 21st century approaches. In particular the articles recognize that more than ever before the boundaries of chemistry and physics are becoming impossible to define as materials scientists drive relentlessly towards the development of ever more microscopic systems. Consequently an understanding of matter at the intrinsic molecular level has become a necessity. The new policy of *Chemical Society Reviews* will ensure that articles are written for Scientists whose need is for a fundametal understanding of molecular behaviour allied with an awareness that the most important advances in 'Chemistry' are made on the basis of an interdisciplinary approach to research.

The new formula has been an almost instant and exciting success as individual requests for the revamped journal have increased, in marked contrast with the general decline in circulation witnessed by many journals recently. In addition to the effect on circulation there has been a significant rise in number of prospective authors and consequently it has been decided to increase the number of issues from four to six per year.