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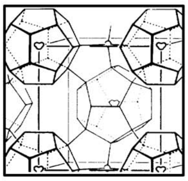


Solvent Structure and Perturbations in Solutions of Chemical and Biological Importance

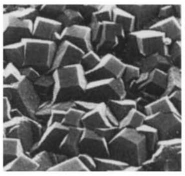
By J. L. Finney and A. K. Soper (pp. 1–10)

Much of chemistry and biology happens in an aqueous environment. Although the water is thought to play a significant role in the various processes, our understanding of these solvent effects at the molecular level is limited. Recent developments in neutron scattering are changing this: we can now begin to see directly how different solutes are hydrated, and how the solute perturbs its nearby solvent. This article discusses recent results on the hydration of both polar and non-polar groups, and tentatively concludes that the classical explanation of the hydrophobic interaction is incomplete.

Helical Poly(isocyanides)

By Roeland J. M. Nolte (pp. 11–19)

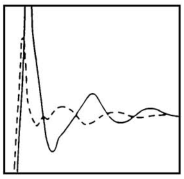
Poly(isocyanides) are synthesized from isocyanides by the catalytic action of *e.g.* nickel complexes. The polymers are poly-Schiff bases and have a helical backbone. The polymerization proceeds *via* a series of consecutive insertions at the metal centre. In this way racemic mixtures of right- and left-handed helices are formed. Helix-sense selective polymerization can be achieved with optically active catalysts and by other procedures. Because of their well-defined structure, poly(isocyanides) have been used as building blocks to construct synthetic systems mimicking the action of enzymes and other biomacromolecules.



Thin Film Diamond by Chemical Vapour Deposition Methods

By M. N. R. Ashfold, P. W. May, C. A. Rego, and N. M. Everitt (pp. 21–30)

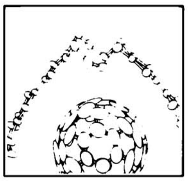
Diamond is frequently advanced as the 'ultimate' engineering material. This review describes, some of the recent advances in the growth of polycrystalline diamond films by chemical vapour deposition (CVD) methods, various of the more commonly employed surface analysis techniques by which such films are characterized, and the properties required of a substrate if it is to support an adherent diamond film. The article concludes with discussion of already realized, and some potential, applications of CVD diamond films.



Kirkwood–Buff Solution Theory: Derivation and Applications

By Kenneth E. Newman (pp. 31–40)

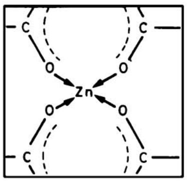
The theory of Kirkwood and Buff is being used with increasing frequency as a way of trying to understand in molecular terms the thermodynamic properties of both electrolyte and non-electrolyte mixtures. The theory is a set of exact relationships between certain constant-temperature thermodynamic properties and integrals of the various radial distribution functions. In this review an outline of the derivation of the theory is given together with some examples of its application to problems of current interest.



Tetrathiafulvalenes as Building-blocks in Supramolecular Chemistry

By Tine Jørgensen, Thomas Kruse Hansen, and Jan Becher (pp. 41–51)

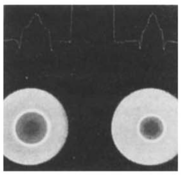
Recently an overlap has emerged between two important areas of current preparative chemistry – the fields of supramolecular chemistry and tetrathiafulvalene chemistry. This review gives an account of recent developments in this overlap-zone along with a brief background. The review first describes the chemistry of planar tetrathiafulvalene crown systems and distorted macrocyclic tetrathiafulvalenes. Then sensor systems based on the electroactive tetrathiafulvalene unit are described. Finally supramolecular species based on tetrathiafulvalenes such as molecular-shuttles, -switches, -wires are briefly discussed.



Polyelectrolyte Materials – Reflections on a Highly Charged Topic

By John W. Nicholson (pp. 53–58)

Beginning with an account of the basic chemistry of polyelectrolytes, this articles goes on to consider recent developments in two of their uses, *i.e.* environmentally acceptable industrial paints and materials for dentistry and medicine. To the paint industry, polyelectrolytes offer the advantage of replacement of potentially damaging organic solvents. To dentistry, polyelectrolytes offer durable materials that have good compatibility with living tissue, a property also being increasingly exploited in other fields of medicine.

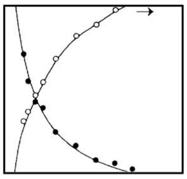


Magnetic Field Gradients in NMR: Friend or Foe?

By Timothy J. Norwood (pp. 59–66)

Anyone who has used an NMR spectrometer is familiar with magnetic field gradients. In the form of inhomogeneities in the static field of the magnet they cause broadening of the spectral lines, often hindering analysis. Although this somewhat negative manifestation of the phenomena is the first experience of most spectroscopists, a growing appreciation of their practical uses has resulted in some of the most important developments in NMR methodology over recent years, often extending its uses far beyond its traditional role as an analytical tool for chemists.

In this article we examine the place of magnetic field gradients in pulsed Fourier transform NMR from two perspectives: as a problem and as a solution to problems.



Thermodynamic Properties of Additive–Surfactant–Water Ternary Systems

By R. De Lisi and S. Milioto (pp. 67–73)

Thermodynamic properties of water–additive–surfactant ternary systems are sensitive to the nature of the additive since it can interact with the dispersed and/or the micellar phases. If the additive does not penetrate the micelles, the interactions between the additive and water and/or the dispersed surfactant hardly affect the properties. If the additive solubilizes in the micelles, the interactions between micelles and additives more or less strongly affect the properties, depending essentially on the hydrophobic moiety of the additive. Thermodynamic studies on the effect of the nature of both the additive and the surfactant are discussed.

Articles that will appear in forthcoming issues include

Electrophoresis of Small Particles **C. Boxall**

TILDEN LECTURE. Studies on Thymidylate Synthase and Dihydrofolate Reductase – Two Enzymes involved in the Synthesis of Thymidine **D. W. Young**

MELDOLA LECTURE. The Role of Aromatic Interactions in Molecular Recognition **C. A. Hunter**

Non-Bonding Molecular Orbitals and the Chemistry of Non-Classical Organic Molecules **C. A. Ramsden**

Carrier-Mediated Transport through Liquid Membranes **H. C. Visser, D. N. Reinhoudt, and F. de Jong**

The Diagnosis of Concerted Organic Mechanisms **A. Williams**

The Colourless 'Chameleon' or the Peculiar Properties of Zn^{2+} in Complexes in Solution. Quantification of Equilibria involving a Change of the Coordination Number of the Metal Ion **H. Sigel and R. B. Martin**

Structure and Dynamics of Electrolyte Solutions. A NMR Relaxation Approach **A. Sacco**

Homo- and Hetero-metallic Alkoxides of Groups 1, 2, and 12 Metals **R. C. Mehrotra, A. Singh, and S. Sogani**

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