

## *Book reviews*

**N. Tanaka, H. Ohtaki and R. Tamamushi (eds.): Ions and Molecules in Solution. (Studies in Physical and Theoretical Chemistry, Vol. 27)** Amsterdam: Elsevier, 1983, viii + 470 pp. ISBN 0-444-42208-0

The coming unification of Quantum Chemistry and Statistical Mechanics is demonstrated clearly in this collection of invited papers at the *VI. International Symposium on Solute-Solute-Solvent Interactions* held at Minoo, Japan in July 1982. The volume contains 33 high quality "camera ready" papers from workers in Japan (18), Europe (8), USA (4), Australia, Israel and Korea. The plenary lectures at this conference by S. Ahrland, J. E. Desnoyers, A. E. Merbach and H. A. Scheraga have been published already in *Pure and Applied Chemistry* **54**, 1451-1505 (1982).

Our relative lack of knowledge about molecules in solution is the theme of this book, and the authors present a wide range of experimental and theoretical techniques for understanding pieces of the solvation problem. The volume is divided into four sections: (1) Theoretical Treatments of Solute-Solvent Interactions, (2) Thermodynamic and Structural Properties of Solutions, (3) Equilibria and Kinetics in Solution and (4) Interactions between Water and Biological Molecules. The sections serve not as a comprehensive review of the field but as a selection of recent advances. For example, the experimental papers cover fluorescence decay measurements, X-ray diffractometry, light scattering, ultrasonic and NMR studies. The theoretical treatments range from *ab initio* studies of isolated hydrated metal clusters to molecular dynamics computer simulations of aqueous electrolyte solutions and path integral methods in quantum statistical mechanics.

This book provides an overview of an exciting area of chemistry and may be a valuable starting point for new workers in the field. Experts in Quantum Chemistry and Statistical Mechanics will certainly appreciate the glimpse of the successes and problems in the fields outside their expertise.

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**Lahmani, F. (ed.): Photophysics and photochemistry above 6 eV.** Proceedings of the 38th International Meeting of the Société de Chimie Physique. Bombannes, France, 17–21 September 1984. Amsterdam: Elsevier 1985; xxii + 672 pp

Vacuum ultraviolet (VUV) spectroscopy has expanded rapidly in both the size of its community and its accessible energy domain since the introduction of synchrotron radiation sources and VUV lasers. It was selected by the French Société de Chimie Physique as the topic for its 38th annual international meeting, which attracted over 100 participants; the proceedings have been collected here in the form of detailed summaries of 70 papers with minuted discussions.

This volume is remarkable for its variety in experimental techniques as well as the range of physical phenomena studied by VUV spectroscopists. Synchrotron radiation has been used by several groups at energies up to 140 eV to study resonant inner- and outer-shell photoionization in small molecules like NO, Si(CH<sub>3</sub>)<sub>4</sub>, CO<sub>2</sub>, and double photoionization in CS<sub>2</sub>, OCS, CH<sub>4</sub>, and SO<sub>2</sub>. VUV ionization energies can also be attained by multiphoton excitation using intense uv/visible laser pulses; O<sub>2</sub> can be ionized above 10 eV by four 354.8 nm photons in Nd:YAG laser pulses 10 ps wide at 10<sup>11</sup> W/cm<sup>2</sup>. Time-resolved nonradiative relaxation processes may be probed in molecular ions like CO<sub>2</sub><sup>+</sup> or C<sub>2</sub>N<sup>+</sup> (prepared by rare-gas lamp excitation) by measuring mass-selected photoion-fluorescence photon coincidences (PIFCO); a variety of other coincidence techniques can yield dynamical information like TOF mass analyses of parent and fragment photoions in dissociation. Condensed-phase VUV applications in this volume include studies of density-sensitive Rydberg states of benzene in inert alkane solutions at pressures up to 200 atm, photoconductivity in liquid rare gases doped with alkanes, and pressure effects on excitonic transitions in solid Ne. Still other papers deal with small-molecule photodissociation, two-photon laser-assisted reactions between rare gases and halides, and photoetching of polymer films by a 193 nm excimer laser.

This handsomely prepared book (which is the 35th volume in Elsevier's studies in physical and theoretical chemistry series) will impress nonspecialists with the current breadth of the VUV field. The scientific quality of the contributions is uniformly high, and the proceedings are sufficiently detailed and referenced to be useful to VUV practitioners looking for updated research reports in their areas.

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