

CHEMICAL SCIENCE

(a)

The chemical sciences cover a broad range of subjects dealing with chemical changes and related phenomena of substances, including free molecules, clusters, surfaces, and solids. The highly brilliant light from SPring-8, covering a whole range of wavelengths from hard X-rays to far infrared, is evidently very useful for the study of various aspects of chemical reactions. In this section, four conspicuous topics in Chemical Science are selected from the experimental reports 2001B and 2002A.

(b)

Soft X-ray undulator beamlines play a central role in the study of spectroscopy and dynamics because the inner-shell excitation/ionization energies of elements of chemical interest lie in the soft X-ray region. By taking advantage of very high resolving power of these beamlines, an increasing number of high quality studies have been performed over the years since the commissioning of each beamline. Progress in this field during the last year includes the successful extension of the coincidence momentum imaging technique to the study of photoelectron angular distribution in the molecular frame (article by De Fanis *et al.*).

Another important and widely-used technique in Chemical Science is the X-ray diffraction. With the dramatic increase in the capability by combining with the 3rd generation synchrotron radiation, both the single-crystal and powder diffraction techniques are increasingly being used to probe rather exotic systems; such studies include the characterization of intermediate states of a laser-induced chemical reaction in a solid (article by Ozawa and Toriumi), the study of the structure of adsorbed or deposited layers on metal electrodes (article by Nakamura and Ito), and the direct observation of the molecular state adsorbed in the nanoporous metal-organic solid (article by Kitagawa). All of these pioneering works are yielding intriguing new results.

Inosuke Koyano