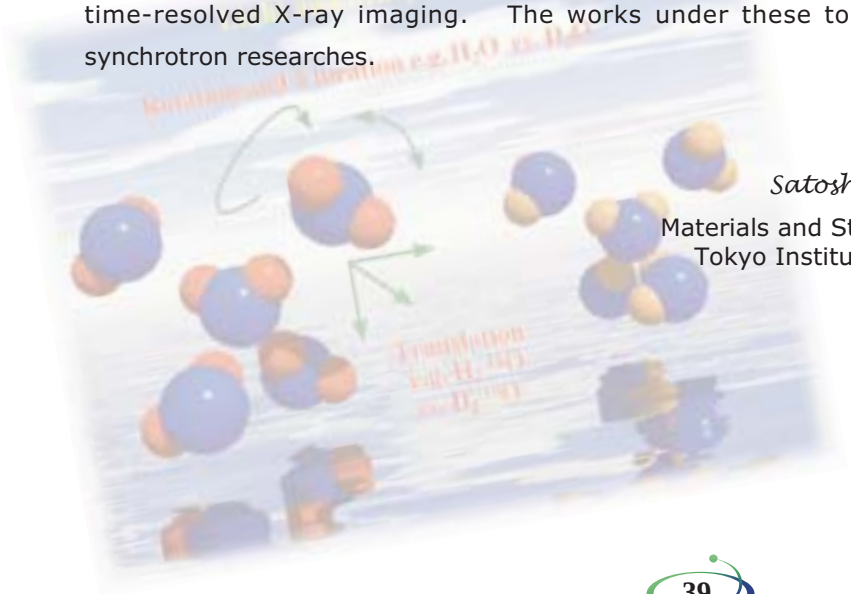
Materials Science
Structure

Materials Science is one of the most active fields in synchrotron researches and covers nearly 45 percent of all applications proposed to SPring-8 during the 2005A period. Synchrotron radiation is extremely powerful and is used for studying the structure of advanced materials, where the atomic and electronic structures of a large variety of crystals and fluids are determined to make a connection with the physical and chemical properties in bulk, surface and interface states. Most of structure-related research programs are being carried out by X-ray diffraction, scattering and imaging techniques. Examples of such experiments are compiled in this volume.

At SPring-8, ten public beamlines mainly serve the experiments of structure-related materials science, having various purposes such as structure analyses by single-crystal X-ray diffraction (BL02B1), structure analyses by powder X-ray diffraction (BL02B2), amorphous and liquid researches with high-energy X-rays (BL04B2), structure analyses of surface and interface (BL13XU), X-ray imaging (BL20B2, BL20XU), inelastic scattering (BL08W, BL35XU), white X-ray topography (BL28B2), magnetic scattering (BL39XU), and R&D and diffraction (BL46XU). The experiments corresponding to the following topics have been also performed at JAERI (BL14B1, BL22XU), RIKEN (BL19LXU) and Hyogo Prefecture (BL24XU) Beamlines. Each of the above beamlines provides the requisite number of photons, sufficient energy, and spatial resolutions and polarization.

Nine topics are selected here out of a considerable number of structure-related studies in materials science. In this volume, scientific interest is focused on (1) charge ordering, spin-density wave and magnetic-field-induced phase transition, (2) liquid structures of D_2O and Se, (3) surface structures, chemical state and strain distribution, and (4) phase tomography and time-resolved X-ray imaging. The works under these topics are advancing the frontiers of synchrotron researches.



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