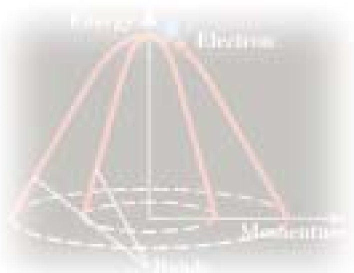
MATERIALS SCIENCE
ELECTRONIC & MAGNETIC PROPERTIES

Materials science, in particular, to investigate the electronic and/or magnetic properties of novel materials, has been markedly in progress these years in SPring-8 because of the improvement and development of new beamlines dedicated to these researches. The high brilliance of SPring-8 is a strong merit to revealing the precise and detailed electronic and magnetic structures of materials by high-resolution and high-quality measurements. Representative experimental techniques used here include high-resolution X-ray scattering, high-resolution X-ray photoemission spectroscopy, high-resolution Compton scattering. A variety of novel materials such as strongly correlated *d*-electron oxides, low-dimensional organic salts, superconducting diamond, and novel uranium compounds are intensively studied by use of the above-mentioned high-resolution spectroscopies. Furthermore, not only bulk materials but also thin films and nanoparticles have become a target of intensive researches because of the recent enhancement of the close relationship between basic and industrial researches. Kubota *et al.* have observed an interesting ferro-type orbital ordering in $Ca_{2-x}Sr_xRuO_4$ by resonant X-ray scattering and interpreted it in terms of two-dimensional crystal field and superexchange interaction. High-resolution X-ray scattering by Terasaki *et al.* has revealed the basic mechanism of charge ordering/melting in an "organic thyristor." Both occupied and unoccupied band structures of high-T_c superconductors have been studied by resonant inelastic X-ray scattering (report by Ishii *et al.*). Recently discovered superconducting diamond has been investigated X-ray photoemission spectroscopy (report by Yokoya *et al.*), which has revealed the electron dispersion essential to the superconductivity. A variety of peculiar properties of nanoparticles such as nanomagnetism and nonlinear optics have been studied by spin-polarized Compton scattering (report by Duffy *et al.*) and high-energy X-ray spectroscopy (report by Yoshikawa *et al.*). Compton scattering has been also applied on Ni-Al shape-memory alloy by Dugdate *et al.* to study the Fermi surface topology. The phonon density of states of PtFe alloy films has been studied by nuclear resonant inelastic scattering for application to perpendicular magnetic recording (report by Hideshima *et al.*). A beautiful Fermi surface of $UFeGa_5$ has been obtained by bulk-sensitive high-resolution X-ray angle resolved photoemission spectroscopy (report by Fujimori *et al.*). Research activity in Materials Science at SPring-8 is now rapidly expanding in both methods and materials. New proposals and challenges are welcome.



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