INDUSTRIAL

SPring-8 has been successfully increasing the use of its cutting-edge facilities by industrial researchers. The most important factor contributing to our success in attracting a wide range of industries is the synchronicity of both the increase in the number of public beamlines dedicated to industrial research and the implementation of various utilization propulsion programs at public beamlines, which have been improved continuously, supported by the Ministry of Education, Culture, Sports, Science and Technology. As of March 2009, SPring-8 accommodates three public beamlines dedicated to industrial research. The first is the Engineering Science Research I (BL19B2) beamline, a standard bending magnet beamline for grazing-incidence X-ray diffraction (GIXD), X-ray reflectivity measurements, powder X-ray diffraction, and X-ray imaging experiments, at which experiments for industrial users have been carried out since the 2001B term. The second is the Engineering Science Research II (BL14B2) beamline, a standard bending magnet beamline, dedicated to XAFS measurements, which began operating for industrial use from the 2007B term. In addition to the two bending magnet beamlines, the third is the Engineering Science Research III (BL46XU) beamline, a standard-type "in-vacuum" undulator beamline, which began operating for industrial use in the 2008A term upon installation of a hard X-ray photoemission spectroscopy system as well as an 8-axis multipurpose X-ray diffractometer. In addition to the three public beamlines, there are three contract beamlines under companies' operation in SPring-8: Industrial Consortium ID (BL16XU), Industrial Consortium BM (BL16B2), and Pharmaceutical Industry (BL32B2). In addition, Hyogo BM (BL08B2) and Hyogo ID (BL24XU), contract beamlines under the local government, are running independent programs for industrial use.

APPLICATIONS

In the present issue, nine topics chosen to represent the outstanding work carried out in the field of Industrial Applications mainly in 2007A and 2007B are introduced here. Although most users of industrial applications had previously belonged to the field of electronics, many researchers from other industrial fields, such as those involving metals, fuel cells, hydrogen storage materials, polymers, cosmetics, and hair care are now joining SPring-8. The topical experiments introduced here were performed using the following techniques: hard X-ray photoelectron spectroscopy (HAXPES; BL47XU), soft X-ray photoelectron spectroscopy (SXPES; BL27SU), X-ray microbeam diffraction (BL24XU), grazing-incidence X-ray diffraction (GIXD; BL46XU), hard X-ray magnetic circular dichroism (BL39XU), nano-XAS and photoemission electron microscopy (BL17SU), powder X-ray diffraction (BL19B2), X-ray microtomography (XMT; BL47XU), and X-ray diffraction (BL40B2).

Three excellent studies from Si and compound semiconductor fields are selected this year as research frontiers of 2008: that is, nondestructive evaluation of band bending and carrier concentration profile in Si shallow junctions using HAXPES and SXPES, respectively, and GaN crystalline quality evaluation using X-ray microbeam rocking-curve mapping. Also, three studies from future electronic device fields are selected. Spectroscopic and structural characterizations were applied to graphene multilayers, ferromagnetic nanosheets, and bit-patterned media. The number of studies in the energy field related to global environmental problems is now rapid increasing. One of the topics is development of hydrogen storage materials using powder X-ray diffraction. The last two topics are directly related to everyday life: that is, damaged hair evaluation using XMT and structural phase transition evaluation in human stratum corneum using X-ray diffraction.

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