Industrial


"Kobushi"- *Magnolia*

Applications

In 2010, seven contract beamlines for industrial application were in operation. The cumulative number of company users increased to 3471 from 2436 in 2009, owing to full operation of the Frontier Soft Matter Beamline (FSBL) BL03XU. It is very felicitous that large portion of BL03XU users also participated to experiments at public beamlines. The establishment of a contract beamline for industrial application encourages industrial application of all SPring-8 facilities, including public beamlines.

Industrial applications of SPring-8 in 2009 was strongly influenced by the "Lehman Shock", and the number of proposals by company users at public beamlines drastically declined in 2009. Rapid recovery of the number proposals to the ordinary level occurred in 2010. In particular, the number proprietary proposals largely increased, and the largest number of proprietary proposals was seen in 2010. It is considered that the measurement service of powder diffraction at BL19B2 started in 2010 will play an important role in encouraging proprietary proposals. It seems that proposals by company users is gradually shifting to proprietary proposals from nonproprietary proposals.

In the present issue, five topics are chosen to represent the work carried out in Industrial Applications. We selected these topics taking into considerations XAFS, powder diffraction, CT, and SAXS to introduce diversity in industrial applications of SPring-8 in terms of field of industry and technique, since the last issue mainly introduced topics using X-ray imaging techniques.

The first topic presented by M. Oki is the application of fluorescence XAFS at BL14B2 to establish a quantitative analysis method of hexavalent chromium in pigments of polymers for industrial products, since hexavalent chromium is regulated by the European Union. XAFS measurements proved that linoleic and oleic acids maintained the valence of chromium during the dissolution process of polyethylene, and these acids are suitable solvents for extracting chromium from polymers.

The *in situ* and time-resolved XAFS investigation on catalysis in fuels cell is reported as the second topic. Bimetallic electrocatalysts such as Pt_3Co have been attracting a great deal of attention, since they have demonstrated both higher oxygen reduction activity and improved stability with much smaller amounts of platinum. Dr. Imai found that Pt oxidation of Pt_3Co saturated at around 40 s from the start of the oxidation process, by time-resolved XAFS measurement. He considered that the saturation of Pt oxidation, which indicated the suppression of Pt oxidation, is a key in the higher corrosion resistance of Pt_3Co.

As the third topic, Dr. Itoh discussed the mixed ionic-electronic conduction mechanism in perovskite oxides using precise powder diffraction data at various temperatures, in order to identify some directions of material design for cathodes for solid oxide fuel cells (SOFC). He speculated that a mixture of covalent and ionic bonds is effective for low temperature operation of SOFC, on the basis of electron distributions derived from powder diffraction data.

Both of the fourth and fifth topics concern the output at the contract beamline BL08B2 established and operated by Hyogo prefecture. The former is a SAXS study on polymer emulsion by Dr. Yamamoto, and the latter is CT observation of polymer foam by Dr. Tateishi. I am very happy to present the vigorous activities of industrial application at contract beamlines.

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