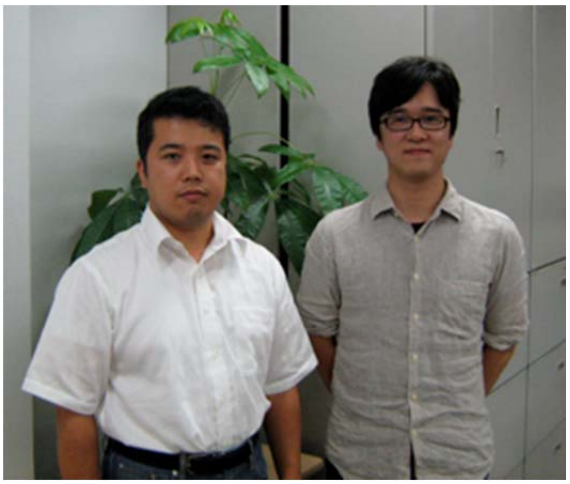
THE BRIDGE

MATERIALS ANALYSIS eNEWSLETTER
SEPTEMBER 2013, ISSUE 3

Customer in the Spotlight



Ryotaro Matsuda *(Associate Prof. on left),*
Hiroshi Sato *(Assistant Prof. on right)*

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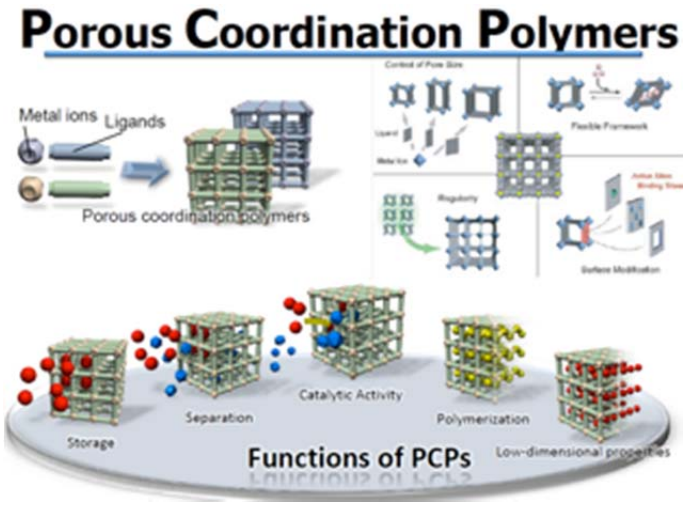
The Susumu Kitagawa Laboratory is among the most well known laboratories performing research on porous coordination polymers (PCPs) and metal-organic frameworks (MOFs). PCPs and MOFs, discovered in the latter half of the 90's, are making significant strides to advance fundamental chemistry and are of great interest to industry in their capacity as gas occlusion and gas separation materials.

Currently, these are important research areas due to the potential in the development of next-generation materials.



From 2007 to 2012, the Kitagawa Laboratory ran a special project called the ERATO Kitagawa Integrated Pores Project. In this project, Ryotaro Matsuda, Hiroshi Sato and the Kitagawa group performed in-situ X-Ray Powder Diffraction measurements of PCPs in 2010 and subsequently succeeded in changing the structure and pore size of the materials. They showed that, as a result of these changes, the gas adsorption properties of PCPs could be controlled. In the journal of Angewandte Chemie International Edition (2010, 49, 7660-7664), they reported synthesizing PCPs using different solvents as templates. They analyzed the structural changes in the PCPs using XRPD while adsorbing gas molecules in them. The results implied that they would be able to absorb and hold dangerous gasses, and would be able to remove impurities from oil in low-pressure conditions in the future.

It was difficult, however, to obtain XRD data at the exact point of each equilibrium state in the isotherm. To overcome this challenge, the Kitagawa group worked with Rigaku Corporation to develop a coincident adsorption/XRPD measurement system for their laboratory.

With this instrument, they were able to demonstrate effective ways to understand the transformation of PCPs, enabling the Laboratory to design and synthesize PCPs down to the pore size.

Coincident Adsorption/XRPD measurement system