



Investigation of Cooperative Metal Sites within Metal-Organic Framework

Yong-Sheng Wei, Osamu Yamada

AIST-Kyoto University Chemical Energy Materials Open Innovation Laboratory (ChEM-OIL),
National Institute of Advanced Industrial Science and Technology (AIST).

Keywords: Metal organic structure (MOF), porous crystal

1. Background

Metal-organic frameworks (MOFs) or porous coordination polymers (PCPs) possessing large surface areas and highly ordered structures, have demonstrated unique superiority in various fields, such as, storage/separation,² luminescence,³ catalysis,⁴ and so on.⁵ Recently, we designed and synthesized Fe-doped Ni-MOFs used for Oxygen evolution reaction (OER). However, we cannot analyze the crystal structure because we cannot synthesize the single-crystals to confirm the accurate locations between Fe and Ni in MOFs. This problem may be well solved by Atomic Pair Distribution Function (PDF) Analysis based on synchrotron radiation experiments at Aichi Synchrotron Radiation (AichiSR) center.

2. Experiments

With a lot of effort, several samples were successfully measured for X-ray diffraction analysis (XRD) on BL5S2. Diffraction data was collected at room temperature through using synchrotron radiation at 20 keV.

3. Results and Discussion

Based on the results of the data collected at the beamline, a preliminary structural analysis was performed. Obviously, we have got higher quality data than laboratory instruments. Now we are working hard to process the data and convert the XRD to PDF data. Further structural analysis will be performed to check the accurate locations between Fe and Ni in MOFs, which will be significantly important for the mechanistic interpretation of our ongoing catalytic experiments.

4. References

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