Research Hotline

UPDATE FROM THE CUTTING EDGE

Apr.-Jun. 2013

The abstracts of the recent research information appearing in Vol.13 No.4-6 of "AIST TODAY" are introduced here, classified by research areas.
For inquiry about the full article, please contact the author via e-mail.

Environment and Energy

Immobilizing Pt nanoparticles inside the pores of metal-organic framework

Highly active catalysts for hydrogen generation from hydrides

We have developed a double solvent method to immobilize ultrafine Pt nanoparticles inside the pores of a metal-organic framework (MOF), MIL-101, without aggregation of Pt nanoparticles on the external surface of the framework. TEM and electron tomographic measurements clearly demonstrated the uniform three-dimensional distribution of the ultrafine Pt nanoparticles throughout the interior cavities of MIL-101. The resulting Pt@MIL-101 composites exhibit excellent catalytic performance for both hydrolysis and thermolysis of ammonia borane to effectively generate hydrogen, which encourages the application of ammonia borane as a promising hydrogen storage material for mobile fuel cell systems. The present results also bring light to new opportunities in the development of high-performance heterogeneous catalysts by using functionalized cavities of MOFs as hosts for ultrafine metal nanoparticles.

Qiang XU

Research Institute for Ubiquitous Energy Devices

q.xu@aist.go.jp

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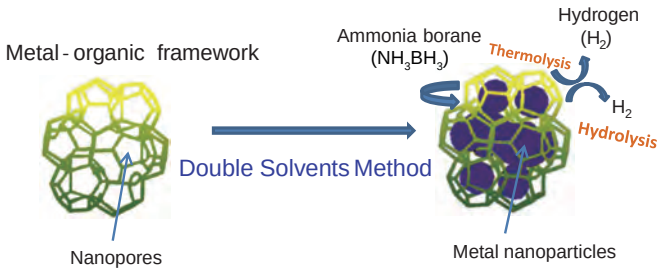

Schematic representation of synthesis of Pt nanoparticle inside MOF nanopores using double solvents method