

Nanoporous Gold Nanotubes with Ultrathin Pt-coating as Fuel Cell Catalysts

Tae-Yeon Shin¹, Sang-Hoon Yoo², Sungho Park*^{1,2}

¹SKKU Advanced Institute of Nanotechnology & ²Department of Chemistry,
BK21 School of Chemical Materials Science, Sungkyunkwan University

The utilization of vertically aligned nanoporous gold nanotube arrays as templates for generating ultrathin Pt-coating on the surface of such structures displaying electrocatalytically active large surface area is described. Essentially epitaxial transition-metal coating down to the 1~2 monolayer level can be prepared, mostly readily by the spontaneous replacement of an electrochemically deposited copper layer by desired Pt-group metal. The epitaxial and essentially pinhole-free nature of the coated gold nanotubes is demonstrated from the form of the cyclic voltammogram after transition metal coating. The potential of the present strategy for synthesizing perpendicular Pt-group nanotubes, displaying high electrocatalytic activities toward important future fuels, such as methanol, formic acid and formaldehyde, is pointed out.