Facile Process for Fabrication of Nanopatterned Counter Electrodes for Dye-Sensitized Solar Cells

임정엽, 김동준, 고종관[1], 김종학*
연세대학교 화공생명공학과; [1]LG 화학
(jonghak@yonsei.ac.kr*)

In this study, Poly(dimethyl siloxane) (PDMS) nanostamps and commercial TiO_2 paste were used to fabricate large-area platinum (Pt) counter electrode platforms with mesh-shaped nanopattern simply. Mesh-shaped nanopatterned Pt counter electrodes were easily made by placing patterned PDMS stamps on a TiO_2 scaffold followed by Pt-sputtering. These mesh-shaped nanopatterned Pt counter electrodes have advantage in enhanced light harvesting based on a light trapping technique. The efficiency of a ssDSSC with a mesh-shaped Pt counter electrode was 7.0% which is much higher than that of thermally deposited electrodes with non-patterned (5.4%) or sputtering deposited electrodes with non-patterned (5.7%). Our facile process to fabricate Pt counter electrodes is compatible with mass production and can be extended to other metal nanoparticles than Pt.