ST-P010

Supercapacitive properties of nickel sulfide coated titanium dioxide nanoparticles

강진현, 류일환, 홍다정, 김그린, 임상규*

국민대학교 화학과

Nickel sulfide (NiS) is one of the most promising candidates as an electrode material for supercapacitors due to its good capacitive properties, high electrical conductivity and low cost. In addition to the development of the new electrode materials, nanostructuring the electrode surface is one of the main issues in enhancing the capacitive performance of the supercapacitors because the increased surface area can improve the charge transfer and energy storage processes occurring at the electrode surface. However, most nanofabrication techniques require complicated and delicate nanoprocesses, and hence are not suitable for practical use. In this work, we developed a simple method to fabricate nanostructured NiS electrodes by depositing NiS onto TiO_2 nanoparticles. First, TiO_2 nanoparticles were spin-coated on a fluorine-doped tin oxide (FTO) substrate, and then NiS layers were deposited onto the TiO_2 nanoparticles by consecutive dip-coatings in the solutions containing nickel and sulfur precursors. This nanostructured NiS electrode showed significantly improved capacitive properties compared to the electrode of NiS films deposited without TiO_2 nanoparticles. The asymmetric full-cell supercapacitor with this nanostructured NiS electrode and activated carbon electrode was also fabricated and investigated.

Keywords: supercapacitor

ST-P011

Variation of the surface structure of the Al / W(110) planes according to the substrate temperature and the coverage

Dae Sun Choi

강원대학교 물리학과

The variation of the surface structure of the Al adsorbed W(110) planes according to the coverage and the substrate temperature has been investigated using LEED and ISS

When the Al atoms were adsorbed on the W(110) surface at room temperature, a p(1x1) of the fcc (111) face were found at the coverage higher than 4 ML. When the substrate temperature was kept at 900 K during Al adsorption and the coverage was 1.0 ML, the surface revealed a p(1x1) of the bcc(110) face and when the coverage is 1.5 ML, the surface showed a p(1x1) of the bcc (110) face together with a p(1x1) double domain structure (fcc (111) face) rotated ± 3° from the [100] direction of the W(110) surface.

When Al atoms were adsorbed on the W(110) surface at the substrate temperature of 1000 K and the coverage was higher than 1.0 ML, the surface revealed a p(1x1) of the bcc(110) face together with p(1x1) double domain structure(fcc(111) face) rotated ± 3° ~ ± 5° from the [100] direction of the W(110) surface.

When Al atoms were adsorbed on the W(110) surface at the substrate temperature of 1100 K and the coverage was 0.5 ML, Al atoms formed a p(2x1) double domain structure When the coverage was 1.0 ML, the double domain hexagonal structure (fcc(111) face) rotated ± 5° from the [100] direction of the W(110) surface and another distorted hexagonal structure was found. Low-energy electron diffraction results along with ion scattering spectroscopy results showed that the Al atoms followed the Volmer-Weber growth mode at high temperature.

Keywords: Al, W(110), surface structure, adsorption