The Effect of Magnetic Field on the Electrocatalytic Activity of Nanocrystalline Ni-P Alloy

曹竣誠、李弘彬、李得勝

E-mail: 371963@mail.dyu.edu.tw

ABSTRACT

In this thesis, a double anodic oxidation method was employed in the preparation of anodic aluminum oxide (AAO) template first. The Ni and Ni-P nanowires were then electrodeposited in the AAO templates, respectively. In the meantime, both the electrodeposited Ni and Ni-P plate electrodes were prepared for comparison. The fabricated nanowire specimens were examined and analyzed using field emission scanning electron microscope (FE-SEM), transmission electron microscope (TEM), vibrating sample magnetometer (VSM) and X-ray diffractometer (XRD), respectively. The AAO template had a thickness of 30?慆, through and well-spaced cylindrical holes of 70-80 nm in diameter. In 0.5M H2SO4 electrolyte, the effects of magnetic field on the electrocatalytic activity of these specimens were investigated. The measurement results showed that the effective increment in surface area of the electrode with nanowire configuration raised the electrocatalytic activity accordingly. Furthermore, with the application of external magnetic field, the Ni nanowire electrode demonstrated the most prominent enhancement in electrocatalytic activity comparing with its plate electrode counterpart.

Keywords : Ni nanowire、Ni-P nanowire、electrocatalytic activity、anodic aluminum oxide

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