Growth Mechanism of Electrodeposited Fe, Co and Ni Nanowires in the Form of Self-Assembled Arrays at Fixed Potential

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The growth mechanism of electrodeposited Fe, Ni and Co nanowires has been investigated by X-ray diffractometry, scanning electron microscopy and electrochemistry. It is found that the current density for deposition of Fe nanowires is higher than that of Co and Ni nanowires under the same overpotential, pH, concentration of metal ions and temperature. Using the electron tunneling theory, this phenomenon has been ascribed to the higher charge transfer coefficient of Fe than that of Co and Ni.

Keywords: Nanostructure; electrodeposition; current density; work function

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