

Formation of Co–Ni Alloy Superlattices Composed of Face-centered Cubic (FCC) and Hexagonal Close Packed (HCP) Atomic Layers Using a Rectangular Pulse Voltage

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Co–Ni alloy superlattices composed of face-centered cubic (FCC) and hexagonal close packed (HCP) atomic layers were electrodeposited using rectangular pulse voltages of 0.85 and 1.1 MHz, respectively. The energy dispersive X-ray spectroscopy and X-ray diffraction (XRD) data demonstrated that the Co–Ni alloy superlattices electrodeposited at 0.85 and 1.1 MHz formed face-centered cubic (FCC) and hexagonal close packed (HCP) atomic layers containing 35.5 and 14.4 wt% Ni, respectively. In addition, the XRD analyses demonstrated that the Co–Ni alloy superlattices designed to exhibit the lattice constants of 0.5 and 1.0 nm showed one and two Bragg diffraction peaks, respectively, in the small-angle X-ray scattering region. The lattice constants calculated from the Bragg diffraction angles were approximately consistent with the designed lattice constants of 0.5 and 1.0 nm.

Keywords: Co–Ni alloy; Superlattice; FCC; HCP; Lattice constant

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