Short Communication

Co–Ni Alloy Superlattice Electrodeposited Using a Rectangular Pulse Current over a Megahertz Frequency Range

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Co–Ni alloy superlattices with a periodic composition modulation of Co were electrodeposited on a Cu plate using 0.3 and 0.35 MHz rectangular pulse currents. The energy dispersive X-ray spectroscopy analysis demonstrated that the Co content in the Co–Ni atomic layers electrodeposited at 0.3 MHz was approximately two times higher than that at 0.35 MHz. The Co–Ni alloy superlattices were comprised of unit lattices with high and low Co content atomic layers. The X-ray diffraction analysis demonstrated that the Co–Ni alloy superlattices had face-centered cubic crystal structures, and one Bragg diffraction peak from the Co–Ni alloy superlattice was observed in the small-angle X-ray scattering region. The lattice constants of the unit lattices were shown to be controlled by the number of Co–Ni atomic layers with either high or low Co contents.

Keywords: Co–Ni alloy; Superlattice; Composition modulation; Small-angle X-ray scattering, Lattice constant

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