Short Communication

Prediction of Mn Contents of Amorphous Co–Mn Thin Films Formed during Electrodeposition

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The Mn content and crystallographic structure of Co–Mn thin films electrodeposited by rectangular pulse voltages over a megahertz frequency range were investigated using energy dispersive X-ray (EDX) microanalysis and X-ray diffraction (XRD). The EDX analyses demonstrated that in accordance with the phenomenological theory of multi-component electrodeposition (*Int. J. Electrochem. Sci.*, 15 (2020) 6561), the Mn content increased with the cathode potentials, significantly changed at resonant frequencies when the cathode potential was equal to the Mn^{2+} potential barrier, and approached a saturated value. The potential barriers of Co^{2+} and Mn^{2+} were determined to be 1.32 and 2.26 V, respectively. The Co–Mn films containing 40-56 wt% Mn were produced from a $\text{Co}^{2+}/\text{Mn}^{2+}$ solution with a mole ratio of 1.2. The XRD analysis revealed that the Co–Mn thin films had amorphous structures.

Keywords: amorphous Co–Mn thin film; cathode potential; potential barrier; electrodeposition

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