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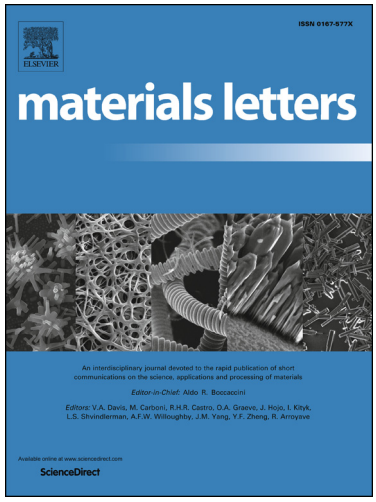

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Interdiffusion in as-deposited Ni/Ti multilayer thin films analyzed by atom probe tomography

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Abstract

The nanoscale design of metallic multilayer thin films is one crucial factor that greatly influences the kinetics, often inducing unusual phase transformations. Metastable or amorphous phases may directly form in as-deposited films of certain thicknesses, which is common for Ni/Ti multilayers. Atom probe tomography and X-ray diffraction analyses are performed here to study the interdiffusion and structural changes as a function of the bilayer thickness in Ni/Ti multilayers. The films are deposited by DC magnetron sputtering with near 50:50 compositions. Multilayers with 5 nm bilayer thickness are found to be highly intermixed, with compositions up to ~25 at.% for both diffuser metals, inducing amorphization reactions during deposition.

Keywords: diffusion, thin films, amorphous materials, atom probe