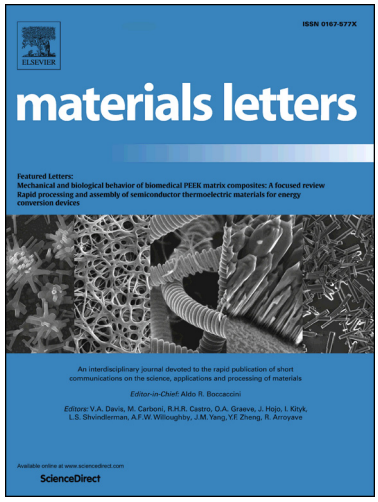

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Nanostructures and Stress-Induced Phase Transformation Mechanism in Titanium Nickelide Annealed after Moderate Cold Deformation

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Abstract

A transmission electron microscopy and *in situ* X-ray diffractometry study of Ti-50.61 at.% Ni shape memory alloy was carried out with an objective to clarify the stress-induced transformation mechanism in nanostructured B2-austenite. Extremely small austenite structure elements (grains/subgrains), about 15 nm in size, were obtained *via* a thermomechanical treatment comprising moderate cold rolling with a true strain of e = 0.55, followed by post-deformation annealing at 300 and 350 ^{o}C. It was unambiguously evidenced that the martensitic transformation preserves its "discrete" (discontinuous) nature even when the size of the parent structure elements (grains/subgrains) decreases down to a lower bound of the nanometer range.

Keywords: titanium nickelide, martensitic transformation, nanostructure, stress-induced martensite, thermomechanical treatment