

Measurements of Recovery Stress and Recovery Strain of Ni-Based Shape Memory Alloys

Authors : W. J. Kim

Abstract : The behaviors of the recovery stress and strain of an ultrafine-grained Ni-50.2 at.% Ti alloy prepared by high-ratio differential speed rolling (HRDSR) were examined by a specially designed tensile-testing set up, and the factors that influence the recovery stress and strain were studied. After HRDSR, both the recovery stress and strain were enhanced compared to the initial condition. The constitutive equation showing that the maximum recovery stress is a sole function of the recovery strain was developed based on the experimental data. The recovery strain increased as the yield stress increased. The maximum recovery stress increased with an increase in yield stress. The residual recovery stress was affected by the yield stress as well as the austenite-to-martensite transformation temperature. As the yield stress increased and as the martensitic transformation temperature decreased, the residual recovery stress increased.

Keywords : high-ratio differential speed rolling, tensile testing, severe plastic deformation, shape memory alloys

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