Investigation on Hardening Behavior of NiTi/Ag Bilayer Films Under Nanoindentation Via Molecular Dynamics Simulation

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Abstract

Molecular dynamics simulation was used to study of mechanical properties of NiTi/Ag bilayer by nanoindentation. The results showed that as the silver film thickness decreased, the maximum load and hardness values increased during nanoindentation. Mechanical properties of bilayer systems are improved with decreasing of silver film thickness. However, the present study seeks to examine the effect of film thickness on the free energy values that is obtained using Jarzynski's equality during nanoindentation. As the silver film thickness was decreased, the free energy difference increased.

Keywords: Nanoindentation, Nitinol, Free energy, Molecular dynamics simulation.