

Fabrication and Characterization of Nanostructured Porous NiTi Shape Memory Alloy

Razieh Khalifehzadeh¹, Hamed Arami¹, Mahyar Mazloumi¹

¹Department of Material Science & Engineering, Sharif University of Technology, Iran

Abstract

Production of Nanocrystalline NiTi alloy from elemental powders was conducted by mechanical alloying (MA) and sintering of the raw materials. Effects of milling time and milling speed (RPM) on crystallite size, lattice strain and X-ray diffraction intensity ratios were investigated by XRD analysis of the products. Observations showed that the crystallite size of the mechanically alloyed NiTi samples decreases with increasing the MA duration and milling speed (RPM). The lattice strain depended on the crystal Nanostructure of the elements and enhanced with the milling duration. Influences of powder compaction pressure, sintering time and sintering temperature on pore percentage and densification of the specimens were determined. Sintering lowered the porosity of the samples. Porosity content decreases with increasing of sintering time, temperature and pressure due to their sharper liquid phase sintering effect.