

Nanostructure characterization in Ni-rich Ni-Ti Shape Memory Alloys Containing Precious Metals

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Shape memory effect allows a material to recover its shape upon heating after it has undergone some amount of deformation. Although Ni-rich NiTi alloy displays shape memory effect with excellent dimensional stability, their potential applications are severely limited because of extremely low transformation temperature. Although the ternary additions to the alloy could raise the transformation temperature, the detailed structure-property relationship is still under debate because of the little knowledge on the microstructure in these alloys. In this work, we characterized the microstructure of Ni-rich Ni-Ti alloys containing Pd and Hf via the use of TEM and 3D atom probe (3DAP). Nanoscale coherent precipitates are dispersed within the matrix. Electron diffraction studies showed the precipitate has monoclinic structure, and the 3DAP analysis showed the enrichment of Ni in the precipitates. The local compositional change and the strain field around the precipitates are associated with the shape memory properties.