

Introduction to NiTi Alloys

Nitinol is a family of alloys, which are comprised of near equiatomic percentages of nickel and titanium. A few variants of Nitinol also include small amounts of a third element that is used to alter certain properties. Nitinol exhibits a thermoelastic martensitic transformation. This transformation is responsible for either shape memory or superelasticity being exhibited by the alloy. Following deformation below the transformation range, this ability, called shape memory, allows recovery of a predetermined shape upon heating above the transformation range. Superelasticity is the ability to recover a shape upon removal of an applied stress over a narrow range of deformation temperatures. The strain recovered with shape memory or superelasticity provides nearly ten times the elastic spring-back of other alloys such as stainless steel.

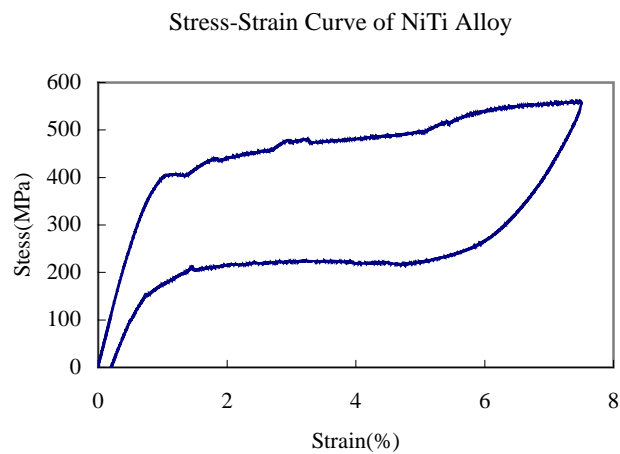


Figure 1 Physical properties of NiTinol

Table 1 Typical Physical Properties, Compositions and Applications of Peier NiTi Alloys

Typical Applications	Composition (percent by atom)	Typical Active A_f
Cell Phone Antennas	~50.7Ni, bal. Ti	10 to 20° C
Guide Wires	~50.9Ni, bal. Ti	0 to 20° C
Stents, Braided Wire, Fine Wire	~50.77Ni, bal. Ti	0 to 10° C
Body Temp. Activated Devices, Stents, Filters	~50.5Ni, bal. Ti	20 to 40° C
Actuators, Demo Springs	~50.0-50.4Ni, bal. Ti	45 to 95° C
Actuators	<49.93Ni, bal. Ti	95 to 115° C