

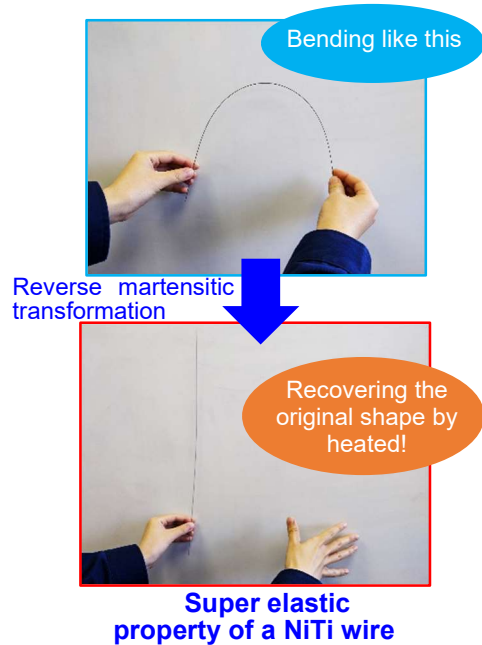
**Introduction to Shape Memory Alloys (NiTi alloy)**

**1. What is memory shape alloy?**

A shape memory alloy (SMA) is an alloy having the properties of shape memory effect and superelasticity. The shape memory effect is the property that a SMA given deformation restores its original shape upon heating. A temperature induces phase transformation (martensite reverse transformation) reversing deformation. The particular temperature at which the reverse transformation starts is called  $A_f$ .

The superelasticity is the property that exhibits extremely higher elastic recovery than ordinal metals. In case of  $A_f$  below the usage temperature, once the stress applied to a SMA is released, a martensite reverse transformation occurs so that a shape recovering by the phase transformation is induced on top of the normal recovery, resulting in an apparent high elastic recovery.

SMA can memorize any shape by subjected with heat treatment.



**2. Characteristics of NiTi alloy**

NiTi alloy, containing the same amount of nickel and titanium, is a typical memory shape alloy. Having one of the **highest elastic recoveries** among SMAs, it can recover the original shape even after given the stain of 8%. This medical approval material is use for an indwelling stent in the body as well as for a medical device for surgery.

**Mechanical properties of NiTi alloys and SUS304**

Properties	NiTi alloys	SUS304
Elastic recovery rate	8%	2%
Tensile strength (Mpa)	1100	≧ 520
Young's Modulus (Mpa)	50	185

**3. Processing of NiTi alloy**

We are handling a wide range of NiTi products such as wires, small-diameter pipes, and sheets. Advanced processing like laser cutting or finishing is also available as well as a shape memory treatment.



NiTi wire with shape memory treatment (with PTFE coating)



Laser cutting on a NiTi pipe

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