

Applications Utilizing the “Superelasticity” of Nickel-Titanium Alloys

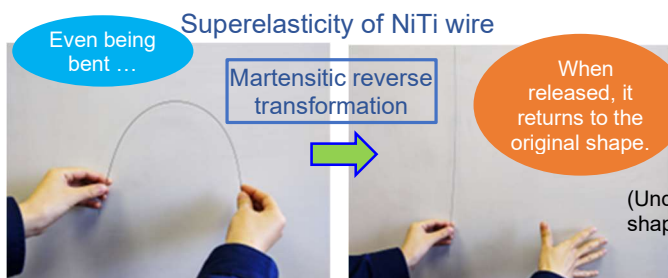
1. Microfabrication technology for nickel-titanium alloys

Nickel-titanium alloys are often used in medical devices such as catheters and guidewires due to their unique properties such as “superelasticity”. Making full use of our proprietary microfabrication technologies such as ultra-short pulse laser processing leads to realize high-performance devices that can fully utilize this “superelasticity” property.

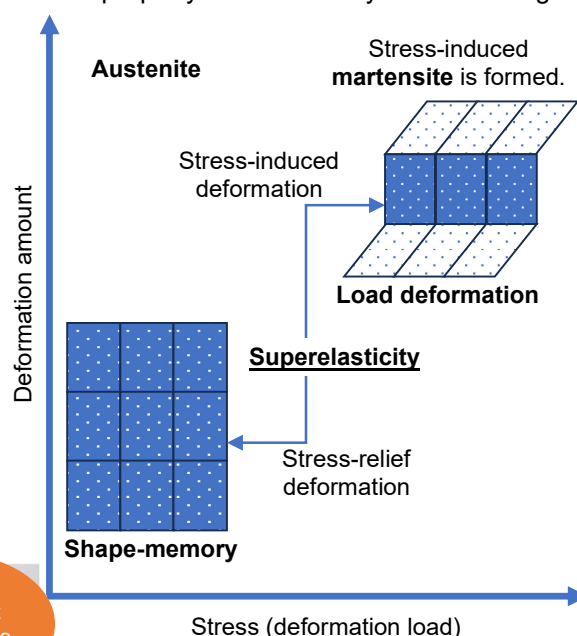
2. The mechanism of nickel-titanium alloy’s “superelasticity”

The nickel-titanium wire possesses a remarkable and fascinating property: it can be bent significantly yet return to its original straight shape if released. The mechanism behind this is as follows.

The alloy remembers its shape” through manufacturing processes or heat treatment, usually at the “austenite” phase state. When the alloy is subjected to a stress loading, however, the stress induces the phase transformation to “martensite” phase while the alloy is deformed by the load. Then, the alloy released from the load, the phase transformation occurs in reverse from the stress-induced “martensite” phase back to the “austenite” phase, restoring the alloy to the memorized original shape.



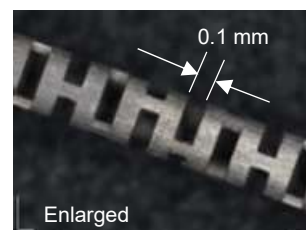
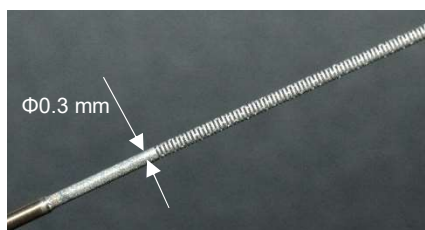
Schematic diagram of superelasticity
- the property evolvement by stress loading -



3. Processed samples of nickel titanium alloy

We provide high-performance micro-machined components that leverage the “superelasticity” of nickel-titanium alloys, e.g. creating ultra-fine slit patterns on an ultra-thin pipe through ultra-short pulse laser processing.

Material: NiTi pipe
0.3/0.2 mm of OD/ID and 0.1 mm of slit width



FUTA-Q Co., Ltd.

URL <https://futaku.co.jp>

E-mail futaku-info@futaku.co.jp

[Headquarters]
33-3 Karahashi-keiden-cho, Minami-ku, Kyoto
City, Kyoto Pref. 601-8454
Tel: +81-75-661-2931

[Tokyo Office]
Mitaka-myajo-palace 3F,
1-1-3, Kamirenjaku Mitaka-shi,
Tokyo 181-0012, Japan
Tel: +81-422-27-7629

