Method Of Producing Niti Based Shape Memory Alloys

Shape Memory Alloys (SMA's) are metallic materials, which have the ability to return to a predetermined shape when heated. The most common Shape Memory Metallic Material is an alloy of Nickel and Titanium called Nitinol. Indian Space Research Organisation (ISRO) at Vikram Sarabhai Space Centre (VSSC) has developed a technology for processing NiTi based Shape Memory Alloys of uniform homogeneity with good control on deleterious impurities like Carbon, Nitrogen and Oxygen contamination.

The method consists of materials arrangement inside graphite crucible, melting under argon atmosphere and finally casting.

Salient Features

- Simplified and Cost effective technology for processing premium quality billets in NiTi base SMA's and other reactive alloys

- Homogeneous product with excellent control in impurities

- Achieves economy in cost and labour and saves time by eliminating the repeated vacuum arc remelting

- Unique way of materials arrangement in the high density graphite crucible to reduce the contamination of the NiTi melt from the crucible

- Special tailor made vacuum induction facility for controlling carbon and oxygen contamination in making NiTi SMA's

Application(S)

- Useful in economical processing of high quality cast billets in NiTi SMA's with low carbon, nitrogen, hydrogen and oxygen contamination. These billets can be used to realize wrought products like Plates, Sheets, Foils, Wires, Sleeves, Forged, Rolled and extruded products through further mechanical working. Inclusion content in the billets processed through this technique is very low; hence very thin wires can be drawn without much problem from extruded rods processed from these billets.

- The products can be used for realization of collapsible antennas, collars for separation systems, couplings, stepper drive mechanism to drive flaps of satellites, etc.

- SMA's have high potential for use in biomedical industries as Bone Plates, Stents, Orthodontic Wires etc.