

IS IT IRONMAN? NO, IT'S ALLOYMAN!

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warp or break, flexible underwires for bras and watch springs for clocks.

(7) Nitinol is also biocompatible, meaning that it can safely be put inside of the human body. An example is the use of Nitinol wires to make dental braces for teeth. Thin Nitinol wires are formed at high temperatures to create a specific shape and length. When the wires are at room temperature they cool down and expand which lengthens the wires. Lengthened Nitinol wires are then shaped around the teeth to make braces. When the patient closes their mouth, body heat will warm the Nitinol wires causing them to contract back into their

shorter original shape. This tightens the braces which puts tension on the teeth to reposition them over time. Nitinol's biocompatibility also makes it useful for reattaching tendons to bones and for knee replacement surgery. Nitinol is also used to make stents which are tubular devices inserted into damaged blood vessels to prevent them from collapsing.

(8) Though the nickel in the Nitinol can have negative effects on health, the titanium in the Nitinol reacts with oxygen in the air to quickly form a titanium oxide coating over the Nitinol. This seals the nickel inside the Nitinol and prevents it from leaking into the body.

Article Questions

- 1) What is an alloy?
An alloy is a mixture of two or more metals or a mixture of metals and non-metals.(2)
- 2) How is 24 karat gold different from 18 karat gold?
24 karat gold is pure 100% gold and 18 karat gold is an alloy that contains 75% gold and 25% of another metal, usually copper, silver or platinum.(3)
- 3) What is steel made of?
Steel is made of iron and around 2% carbon.(4)
- 4) Besides composition, what is the main difference between iron and steel?
Steel is much stronger than iron.(4)
- 5) What is rebar and why is it needed to make tall buildings?
Rebar is a steel rod that is anchored in concrete. This reinforced concrete can hold much more weight than concrete alone.(4)
- 6) What are the three elements found in stainless steel alloy?
Iron, carbon and chromium.(5)
- 7) Why doesn't stainless steel rust?
The chromium in the stainless steel forms a chromium oxide coating which covers and seals the stainless steel preventing oxygen from getting to the iron atoms within and forming rust.(5)
- 8) What is Nitinol composed of and give three unique properties of Nitinol.
Nitinol is composed of half nickel and half titanium. (1 or 6)
It has these following unique properties:
 - 1) It is a shape memory alloy, meaning that it can reform its original shape after being bent or deformed.(6)
 - 2) It is superelastic.(6)
 - 3) It is biocompatible so that it can safely be in contact with the human body.(7)