

Investigation 1

Exploring Memory Metals

You will have a chance to investigate the piece of wire that has been provided by your instructor. This wire is part of a general group of metals called “memory metals” or “smart metals”. This particular metal is called Nitinol. It is a metal **alloy**. An alloy is a combination of two or more metals. Nitinol contains roughly equal numbers of nickel and titanium atoms.

Please use extreme caution when using hot water in the procedures below. Wear safety goggles when working with the hot water.

1. Your teacher will give you a piece of memory metal. Make coils in the wire by wrapping it around your pencil several times. Is the wire easy or difficult to bend?
2. Place the wire into a beaker of hot water. What happened?
3. Use two tongs to try to bend the wire while it is in the hot water. What happens? Take the wire out of the hot water using the tongs. How is the wire different than it was when it was at room temperature?
4. Set the metal on a table and watch what happens as the metal cools. Try to bend it as it cools. What happens?
5. What questions came to mind as you performed this experiment? What questions do you have about the things you have just observed? What else would you like to know about memory metals?
6. Why do you think these wires fall into a category called “smart materials” or “memory metals”?

7. What do you think might be happening when the metal is heated up and cooled down? What do you think might be happening to the atoms inside the metal?

8. Have you ever seen memory metals used before? Can you think of ways engineers might use these memory metals to solve problems.

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