Silver Battery

Overview: We'll be using electrochemistry to make a battery that reverses the chemical reaction that puts tarnish on grandma's good silver. Never polish your tarnished silver-plated silverware again! Instead, set up a "silverware carwash" where you earn a nickel for every piece you clean. (Just don't let grandma in on your little secret!) It's safe, simple, and just needs help with the stove.

What to Learn: This is a very simple battery that works using electrochemistry.

Materials

- stove (with adult help)
- skillet
- aluminum foil
- water
- baking soda
- salt
- real silverware (not stainless)

Lab Time

You can safely dip your silverware into a self-polishing solution. Here's how to do it:

1. Line your skillet with aluminum foil.
2. Add one to two cups of water to your skillet (depending on the size of your pan.)
3. Add a teaspoon of salt.
4. Add 1 teaspoon baking soda.
5. When your solution bubbles, place the tarnished silverware directly on the foil. Start with a small, really tarnished piece so you can see the cleaning effects the best.
6. Use tongs to flip it over. This reaction happens quickly.
7. Only the parts touching the foil will get cleaned, so you'll want to move the foil around (or add more) so it comes in good contact with the silver.
8. Lift out the silverware, run under cool water, and wipe dry.
9. Toss the foil in the trash (or recycling) when you're done, and the liquids go down the drain with plenty of water.

Reading

Your silver turns black because of the presence of sulfur in food. Here's how the cleaning works: The tarnished fork (silver sulfide) combines with some of the chemicals in the water solution to break apart into sulfur (which gets deposited on the foil) and silver (which goes back onto the fork). Using electricity, you've just relocated the tarnish from the fork to the foil. Just rinse clean and wipe dry.

This is a very simple battery, believe it or not! The foil is the negative charge, the silverware is the positive, and the water-salt-baking-soda solution is the electrolyte.

Exercises

1. Where is the electrolyte in this experiment?
2. Where does the black stuff that was originally on the silverware go?
3. Where's the electricity in this experiment?
4. Where would you place your DMM probes to measure the generated voltage?

Answers to Exercises: Silver Battery

1. Where is the electrolyte in this experiment? (The water + salt + baking soda solution.)
2. Where does the black stuff that was originally on the silverware go? (On the foil.)
3. Where's the electricity in this experiment? (The solution is heated, adding the needed energy make this chemical reaction take place. The current flows from plus (silverware) to minus (foil).)
4. Where would you place your DMM probes to measure the generated voltage? (The black probe on the foil and the red probe on the silverware.)