California State University of Bakersfield, Department of Chemistry

Gold and Silver Pennies

Introduction:

What would you guys do if you could make gold from your own home? Back in the medieval days we had what we call alchemist! Alchemist use to spend weeks trying to convert metals into gold! However, they were never able to succeed! Today we will be alchemist and try to make gold! REAL GOLD!!

We are going to have our pennies in NaOH and zinc solution, and a chemical reaction will be taking place called galvanization. Galvanization is what is going to cause our pennies to appear silver because it was coat them with zinc. The heat from the hot plate is going to cause the zinc and copper from the pennies to merge together producing what seems like gold but is really brass.

Are you guys ready to see with your own eyes if we are really making gold or brass?

Materials:

- Pennies
- Powdered Zinc
- Sodium Hydroxide
- Tongs
- 500 mL beaker
- Hot plate

Safety:

- Always wear eye protection and gloves when doing chemistry experiments!
- This experiment generates toxic fumes. Be sure that it is performed in a well-ventilated area.

Procedure:

1. Pour about 2 grams of zinc into the 500 mL beaker. If the zinc isn't weighed out for you or there isn't anywhere to weight it, a scoop of zinc would do.
2. Pour 400 mL of a 3M NaOH solution into the beaker.

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3. Heat the mixture on a hot plate, but don't let it boil. Once it is near boiling temperature, you may take it off and put the pennies in the solution. Let them sit there until they turn silver. This may happen within 2 minutes, but can take as long as 10 minutes.
4. Use tongs to remove the pennies out of the solution and rinse the pennies with water to remove chunks of zinc. What color are the pennies now?
5. You can now place the silver pennies on the hot plate. Make sure you bake both sides! The pennies will be a little hot so make sure you dump them into a beaker with some water to cool them off! What color are the pennies now?
6. Write down what happened in the

Data and Observations:

Record your observations and measurements here.

Original color of pennies	Color of pennies after reacting with zinc and 3 M NaOH	Final color of pennies

Questions:

What is the name of the chemical reaction that was taking place?

What element did we use to plate onto the pennies?

Scientists often change variables in their experiments to see how they may affect the experimental outcome. What happens if you do the same experiment but use a more dilute solution of sodium hydroxide (1 M NaOH)?

References:

http://chemistry.about.com/od/chemistryhowtoguide/a/goldsilverpenny.htm

http://www.chem.ucsb.edu/~outreach/station4.htm

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