

Name _____

An Alchemist's Dream Turning Copper into Gold

The “science” of alchemy was based off attempts to turn common metals into gold. The belief was there is a special ingredient (the alchemist's stone) that was yet to be discovered that could turn a metal to gold. They failed because you cannot change an element into another without a nuclear reaction. They did, however, find several of the principles for which modern chemistry is based.

In this lab, you will give a penny a *gold appearance*. What you will actually do is make an alloy or solution of metals. The alloy you are producing is **brass** (zinc dissolved in copper).

In 1982 pennies went from being 95% copper by mass and 5 % zinc to 97.6% zinc by mass with a thin copper coating (2.4%). This change became necessary because the value of the copper used in creating a penny was coming close to exceeding 1 ¢. Meaning individuals could “buy” pennies melt them down and sell the metal at a profit.

Procedure

Obtain:

a clean shiny penny

20 mL of 3 M NaOH in a 100 mL beaker <~ **this is caustic, use caution.**

A small piece of zinc

250 mL beaker with water

1. Set up a Bunsen burner and ring stand. Place the ring up high.
2. Carefully place the a couple of pieces of zinc in a 100 mL beaker with 20 mL of sodium hydroxide, and place it on the ring stand.
3. Fill the 250 mL beaker half way up with tap water and place it on the side.
4. Carefully heat the solution until it gently bubbles. Do NOT vigorously boil or heat to dryness. BE CAREFUL not to inhale the fumes and be careful with the hot liquid!! Turn down the Bunsen burner when necessary. It needs to continuously gently boil for the reaction to take place.
5. Add the penny to the solution.
6. After no more change is observed, remove the penny from the liquid using the tongs and rinse it in the 250 mL beaker.
7. Observe and record any changes below.

Questions

1. Brass is a substitutional alloy. Explain the difference between an interstitial alloy and a substitutional alloy.
2. Metals like brass are great conductors of heat and electricity. **Fully** explain why.
3. Someone may have said gold was created in this experiment, devise a test to determine if gold created.