Chemistry “A Penny for Your Thoughts Lab (Alloys)”

Background Information

Pre-1982 pennies are composed of pure copper. During 1982, the rising cost of copper caused a penny to cost more than 1¢ to make & the U.S. Treasury was losing money in the production of pennies. The high cost of copper finally resulted in the U.S. Treasury changing the composition of pennies in 1982. Post-1982 pennies are made of an alloy of 99.2% zinc & 0.8% copper & then plated with pure copper. This makes the total composition of the post-1982 pennies 97.5% zinc & 2.5% copper (http://www.pennies.org/history/eight.html).

Materials

- Comfy goggles
- Apron
- Pre-1982 penny
- Post-1982 penny
- Bunsen burner
- Striker
- Crucible tongs
- (Optional) Beaker with water for cooling pennies

Safety Precautions

1) Wear the comfy goggles & apron for all parts of this experiment.
2) Do not lean or rest your arms or elbows on the lab table during any part of this experiment.
3) Stand for the actual experiment. Do not sit on the lab stools.

Procedure

1) Please record all your observations on another sheet of paper.
2) Hold the pre-1982 penny with the crucible tongs in the hottest point of the Bunsen burner with the burner tipped completely sideways. DO NOT HOLD THE PENNY DIRECTLY OVER THE BARREL OF THE BUNSEN BURNER!! Leave the penny in the flame for several minutes to observe its behavior. Record your observations on another sheet of paper.
3) Hold the post-1982 penny with the crucible tongs in the hottest point of the Bunsen burner with the burner tipped completely sideways. DO NOT HOLD THE PENNY DIRECTLY OVER THE BARREL OF THE BUNSEN BURNER!! Leave the penny in the flame for several minutes to observe its behavior. Record your observations on another sheet of paper.
4) Please do not repeat any part of this experiment until you have answered the analysis questions on another sheet of paper. You may repeat this experiment after you have completed the analysis questions.
Analysis

1) What is an alloy?

2) Please give 4 adjectives that describe an alloy.

3) Which penny is an alloy? Why?

4) What is an element?

5) Which penny is a pure element?

6) What is a compound?

7) Which penny is a compound?

8) Are the changes you observed in this lab physical changes or chemical changes? How do you know?

9) Please describe & draw the particles of the pre-1982 penny.

10) Please describe & draw the particles of the post-1982 penny.

11) Please describe the relative melting points of copper & zinc.