Exploring Creation with Chemistry, 3rd Edition – Errata File

This file contains the corrections for the 6th Printing: October 2021 of the **Student Notebook**. The printing for the Student Notebook may not be the same as for the Textbook and Solutions and Tests Manual. Corrections for the Textbook and Solutions and Tests Manual are in separate files. (Posted July 2024)

Clarifications:

Page 517 – Experiment 10.3, Steps 2-5 of the Procedure section were revised for clarity and safety. See revised page below.

Pages 592-593 – Experiment 16.2, Materials List and Procedure Steps 5-10 were revised for clarity. See revised pages below.

Correction:

Page 92 – #10 b. configuration should be: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8 4p^6 5s^1$

(insert $3s^2$ after $2p^6$)

EXPERIMENT 10.3

DATE

Purpose:

To investigate a solute that releases heat when dissolved.

Materials:

- Beaker (A short, fat glass will do.)
- Lye (This is commonly sold with the drain cleaners in hardware stores and supermarkets. Make sure that your bottle is labeled 100% lye or something similar. If you cannot find lye, you can order it online. It may be listed under its chemical name, sodium hydroxide. *Always use this chemical in a well-ventilated area.*)
- Rubber gloves
- Water
- Sink
- Tablespoon
- Safety goggles

Question:

Can a solute release heat when dissolved?

Procedure:

1. Put on the gloves and safety goggles.

2. Put the beaker in the sink directly under the faucet.

3. Slowly turn on the water and add enough water to your beaker so that the water level in it is about 1.5 centimeters high.

4. Measure 3 tablespoons of lye and slowly add it to the beaker.

5. Stir the solution with the tablespoon until all or most of the lye dissolves.

6. Take one glove off and *carefully* touch the outside of the beaker, near the bottom. **Record your observations in the data table.** Most likely, the beaker will feel warm. It might be quite hot, so be careful.

7. Continue to stir the solution with the other hand, and periodically touch the outside of the beaker near the bottom to see how hot it is getting. Once again, *be careful* when you touch the beaker with your bare hand because it can get very hot! **Record your observations.**

8. Eventually, the solution might get so warm that you can no longer comfortably touch the beaker. At that point, put the glove back on.

EXPERIMENT 16.2

DATE

Purpose:
To create a Galvanic cell from lemons.

Materials:
- 4 juicy lemons
- 4 copper pennies (Pennies from before 1982 have higher copper content. You can also use copper wire instead of a penny.)
- 4 two-inch zinc coated (galvanized) nails
- 5 small wires, ideally with alligator clips
- Voltmeter (optional)
- Pre-wired LED (Light Emitting Diode) bulb
- Safety goggles

Question:
Can you create a Galvanic cell battery from common household items that can light an LED bulb?

Procedure:
1. Squeeze the lemon gently with your hands or roll it on a table with some pressure to release the lemon juice. Don't rupture the lemon's skin.
2. Make a small penny-sized cut in the lemon and insert the copper penny into it with half of the penny sticking out.
3. Insert the galvanized nail into the other side of the lemon, ensuring that the nail does not touch the penny.
4. This is a single cell of a battery. The nail and the penny are the electrodes, and the lemon juice is the electrolyte.
5. If you have a voltmeter, connect one wire of the voltmeter to the nail and the other to the penny. Note what it reads. If you don't have a voltmeter, skip to Step 6.
6. Now try to connect one wire from the nail to the LED wire and another wire from the penny to the other LED wire. What do you see? This current is not enough to light an LED light. To have enough current, you will need to add more lemons
7. Create 3 more of the same lemon batteries.

8. Connect 5 wires in this order:

   Wire 1: LED wire to galvanized nail in lemon 1

   Wire 2: galvanized nail in lemon 1 to penny in lemon 2

   Wire 3: galvanized nail in lemon 2 to penny in lemon 3
   Wire 4: galvanized nail in lemon 3 to penny in lemon 4
   Wire 5: galvanized nail in lemon 4 to LED wire

9. What do you see? **Record your observations in the data table.** Can you determine which is the cathode, and which is the anode in this experiment based on figure 16.3?

10. Clean up and return everything to the proper place.

Hypothesis:

DATA and OBSERVATIONS: