

Piling on the Volts or The Voltaic Pile Lab

(This is really a current source lab.)

Most of our portable electronic gadgets and toys require DC current source and that source may be a battery. Batteries contain chemical energy and that chemical energy is converted to electrical energy when the battery is connected into a circuit.

Objectives:

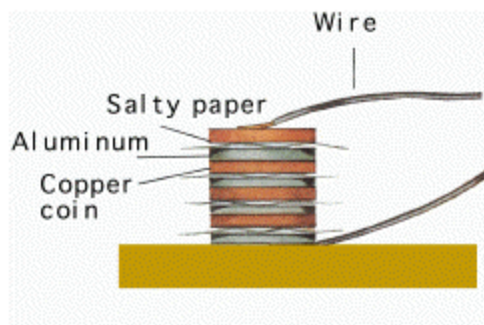
1. Construct a working Voltaic pile.
2. Compare various types of Voltaic piles.
3. Analyze the chemistry (I know, this is a physics class ...) of a Voltaic Pile.

Materials:

Scissors	wire stripper	multi-meter	beaker
Pennies (12)	Nickels	Al foil	wire (2 lengths)
paper towels	LED	zinc coated washers	
NaCl H ₂ O	Vinegar	Lemon juice	

Procedures:

1. Construct a voltaic pile with alternating pennies, solution saturated paper towel and nickels or aluminum. Record the materials your group used.
2. Study the diagram below for the correct order of the “pile” to have six layers.
3. Attach (hold) a wire to each end of the pile.
4. Determine the positive end and negative end of the pile and Measure and record the voltage.
5. Connect the LED to the wire, the long wire from the LED is connected to the positive side of the “pile.” Check the LED for illumination.



The diagram above shows 4 layers.

On your own paper compose an analysis of your voltaic pile to include the following:

1. Record the materials for your voltaic pile.
2. Measure and record the voltage of your voltaic pile.
3. Double the size of your voltaic pile and again measure and record the output voltage.
4. Determine which end of the pile would be positive and which end of the pile is negative (the penny or aluminum).
5. Write an analytical paragraph comparing your "pile" to other types and sizes of "piles" in the classroom. Include which performed best, worst, and quantifiable data.
6. The chemical equations are for a typical alkaline "D" cell. Complete the following tasks.
 - a) Balance the equations.
 - b) Determine which of the equations is an oxidation or reduction reaction.
 - c) Which equation absorbs electrons and which releases electrons?
 - d) Which of the equations occurs at the positive terminal and at the negative terminal of the battery?

Anode Reaction:



Cathode Reaction:

