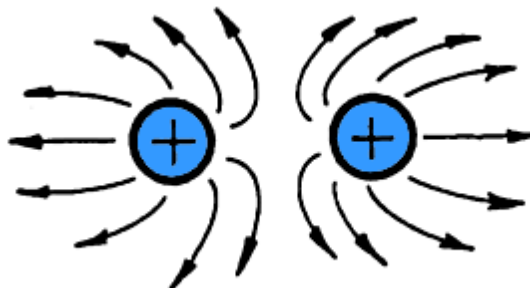
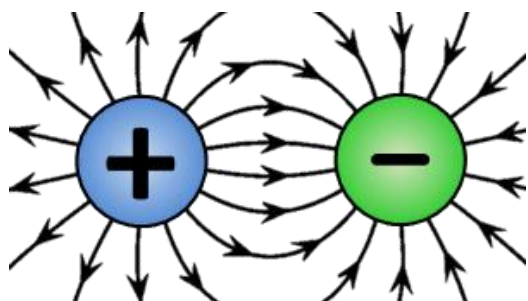


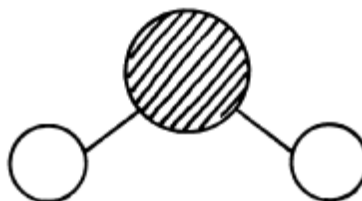
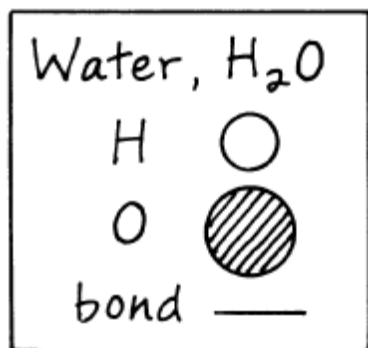
Name: _____

Chemical Potential Energy

Just like magnetic PE, chemical PE is due to the attraction or repulsion that objects or their parts have for each other. Atoms are made of charged particles (negatively charged electrons and positively charged nuclei) that attract and repel each other. Since opposite charges attract, negatively charged electrons (-) and the positively charged (+) nucleus within atoms attract each other. However, since like charges repel each other, electrons repel other electrons and the nucleus of an atom (+) will repel another atom nucleus (+).



Chemical bonds are the attractive forces between atoms that enable the group to act as a unit. In the figure, straight lines represent the bonds between atoms in the molecule for water. There is no actual physical attachment between the atoms, only an attractive force due to differences in the charged particles in the atoms.



The potential energy that substances have due to their bonds is called chemical potential energy or simply chemical energy. During a chemical reaction, one or more chemicals called reactants are changed into one or more new substances called products. The changes during a chemical reaction are due to the breaking and making of chemical bonds, which causes changes in chemical potential energy.

There are two easy ways to measure this energy using a thermometer. The first type is called an **exothermic reaction**. When materials react, heat is given off. If the reaction occurs in a container, the temperature of the mixture would rise due to this released heat. In this case, the potential energy of the two reacting materials is greater than the material it creates.

The other type of is called an **endothermic reaction**. In this case, the potential energy of the product is greater than that of the materials you are mixing together. Energy is not created; instead, energy, such as heat energy, is taken in and transformed into chemical energy. The products of an endothermic reaction are cooler than the reactants. If the reaction occurs in a container, the temperature of the mixture would decrease due to the heat being removed and used to form bonds.

Chemical Potential Energy

Safety Glasses on at all times for both experiments!

Experiment #1

Materials 75 ml vinegar 125 ml flask thermometer 1 scoop of baking soda

Procedure

1. Careful add the 75 ml of vinegar to the 125 ml Erlenmeyer flask.
2. Place the thermometer in the flask and record the temperature after 5 minutes. _____
3. Add 1 scoop of baking soda (measured in the small 50 ml beaker). **Note: it will bubble out.**
4. After it bubbles, replace the thermometer back in the flask. While gently swirling the flask, observe the thermometer and note the change in temperature. Record the temperature. _____
5. Remove the thermometer and carefully clean out the Erlenmeyer flask with water.
6. Based on your knowledge of chemical energy, what type of reaction is this? Why???

7. Record any newly gained information on your PE graphic organizer.

Experiment #2

Materials 75 ml vinegar 125 ml flask thermometer steel wool

Procedure

1. Place steel wool in the 125 ml flask and place the thermometer in the flask.
2. Wait about 5 minutes and write down the temperature.
3. Remove the thermometer.
4. Add 75 ml of vinegar and soak the steel wool for two minutes gently swirling the flask as you go.
5. Carefully pour the vinegar out of the flask. Make certain that the steel wool does not fall out.
6. Place the thermometer back into the 125 ml flask and close the lid. Make certain the steel wool is resting against the thermometer (not underneath).
7. Wait 5 minutes.
8. Observe the thermometer and note the change in temperature. Record the temperature.

9. Based on your knowledge of chemical energy, what type of reaction is this? Why???

10. Record any newly gained information on your PE graphic organizer.

11. Go to schoology and complete the Chemical, Electrical, and Magnetic PE assignment.