Answer on Question #84022 – Chemistry – Physical Chemistry

I built a conductivity meter from 9v battery, 3 pieces of electrical wire, light bulb, and put in solutions of salt, baking soda, vinegar with cup of water. Light never came on but in salt water swirled, turned brown, battery got hot. What did I do wrong?? Must take pics of each for the points.

Solution:

Salt water is a good conductor of electricity. Salt molecules are made of sodium ions Na^+ and chlorine ions Cl^-. (An ion is an atom that has an electrical charge because it has either gained or lost an electron.) When you put salt in water, the water molecules pull the sodium and chlorine ions apart so they are floating freely.

1. To light up the need to form a galvanic system with two electrodes. Wrap two tongue depressors in aluminum foil. These will be your electrodes.
2. Cut three 6-inch pieces of insulated copper wire and strip a half-inch of insulation off each end.
3. Connect one end of a wire to the positive terminal of the battery - hold it in place with masking tape. Connect the other end of the wire to the 3.7v light bulb in socket. (Just wrap the wire around the bottom of the bulb, if you don't have a socket. You may have to secure it with tape.)
4. Take the second piece of wire and connect the light bulb socket with one of the electrodes. Use masking tape to stick the bare end of the wire on the aluminum foil near the top the electrode.
5. Use the third piece of wire to connect the negative terminal of the battery with the other electrode.
6. Test out your circuit by touching the two electrodes together. This should complete the circuit and allow electricity to flow from one terminal of the battery to the other, lighting up the light bulb in the process. If the bulb doesn't light up, check your wire connections to make sure they are all secure and then try again.
7. Pour 1 cup water into a cup or beaker. Stir in the cup a teaspoon of salt until it dissolves. Put the electrodes in the salt water without touching them together. No need use salt, baking soda and vinegar in the same solution. You may use salt (Na^+ and Cl^-) in the first experiment, soda (Na^+ and HCO_3^-) in second and vinegar (H^+ and CH_3COO^-) in third. These substances dissociate in water to form positively charged and negatively charged particles. Better use salt or soda because they dissociate better but you can try also vinegar. In this case, the light bulb will be lit.