Make Your Own Handwarmer

PURPOSE

To observe an exothermic reaction and calculate the change in temperature.

MATERIALS

- No. 0000 steel wool
- Sodium chloride
- 3% hydrogen peroxide
- Activated carbon, finely ground
- Quilted cotton squares
- Water
- Water Bottle
- Pipets
- Graduated cylinder
- Small plastic closable bag

PROCEDURE

Prepare a control by following the procedure but leave out the steel wool. Be sure to take and record temperature readings for the control each time you take them for the test.

1) Measure out 5.0 g of sodium chloride.
2) Measure out 1.5 g of finely ground activated carbon.
3) Place a 2" square or round cotton pad on the lab table.
4) Flatten a piece of steel wool about the same size as the cotton pat and place it on top of the cotton pad,
5) Add the sodium chloride to the steel wool pad, then add the activated carbon onto the steel wool.
6) Place the other cotton pad on top. Squeeze the layers together. Keep the pads level to avoid any solid from spilling out/
7) Place the pads into one corner of the plastic bag.
8) Using a pipet, add 10 mL to the bag, on the cotton pads.
9) Carefully knead the cotton pads through the bag. Do this gently to keep all ingredients in contact with each other.
10) Take and record the temperature of the contents in the bag. Leave the thermometer in the bag.
11) After two minutes, take and record the temperature again.
12) Using a pipet, add 10.0 mL of hydrogen peroxide to the contents in the bag.
13) Take and record the temperature.
14) Take and record the temperature every minute until there is no longer any change.

ANALYSIS

1) Calculate the temperature change. Be sure to show your work and include all needed units.
2) Is there and difference between your control and test bags? Explain.

3) Did a chemical reaction occur? Explain
4) Write a balanced chemical equation.
5) Explain why there was a change in the temperature of the water.
6) How might you use an exothermic process to solve a real-world problem?