

Experiment 2

Warming Behavior of Solids

Name _____ Per _____

Purpose: To organize data (second step of the *Scientific Method*) by investigating the melting points of pure substances

Careful observation of a familiar object usually reveals characteristics not recognized before. You noted this as you studied the candle in Experiment 1. These details of observation raise questions. Let us give attention to one such question:

What is the colorless liquid in the bowl at the top of the burning candle?

This is a question with a ready answer. Perhaps the liquid is just melted wax. But how do you know this? What evidence can you offer? What kind of experiment would help you to decide if this ready answer is correct?

Let us proceed by comparing the behavior of several different substances when heated.

PROCEDURE:

Part I

a. Place a steel can lid on an iron ring attached to a ring stand as shown in Fig. 2-1. Adjust the height of the ring until the lid is about 8 centimeters above the candle.

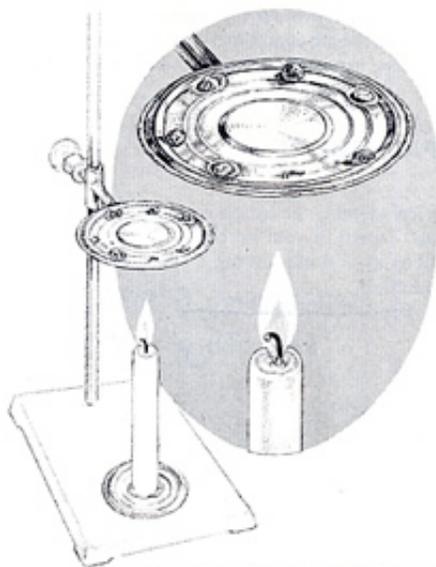


Fig. 2-1. Arrangement of substances on a lid.

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b. Place on the lid, equally spaced near the edge, small, approximately equal amounts of each of the following substances (a quantity about the size of a match head is appropriate):

silver chloride, candle wax, sulfur, lead, tin, copper wire, and steel wool.

c. Light the candle, and adjust the ring height until the tip of the flame is about 4 cm directly below the center of the lid. Heat the lid for about 3 minutes. Record your observations as you make them, paying particular attention to the melting behavior and order.

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d. Remove the candle and adjust the height of the iron ring so the lid is about 20 cm above the top of a burner. Slowly heat the lid with the burner flame noting the order of melting of the samples. Raise the burner when necessary to melt more samples. (Boom will demonstrate any samples that do not melt). Record your observations.

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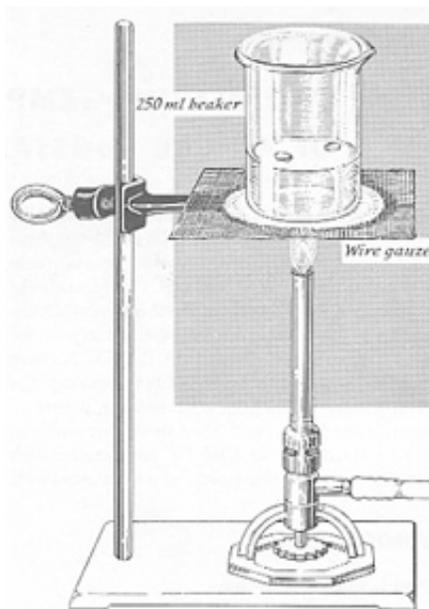
Instructor's results:

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Part II

Now let us heat some of the solidified liquid from the bowl of the candle and some of the candle wax from the candle stick to see how they compare.

a. Remove the lid from the ring stand and replace it with a wire gauze and a 250 milliliter beaker about one-third full of water.



b. Pour a few drops of the liquid from the bowl of a burning candle onto a piece of paper. Break off a small piece of the solid and place it on the water contained in the beaker or can. Obtain a piece of candle wax by cutting a chip from the bottom of your candle. Both pieces should be about the same size. Place both pieces on the water in the beaker keeping them separated.

c. Heat the beaker with a burner flame and note when each substance starts to melt. Allow the wax to solidify, then discard it in the waste can. *Do not pour wax, or any solid, into the sink.* Did the two samples melt at about the same time?

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QUESTIONS AND EXERCISES:

1. How does you observed order of melting for the substances tested compare with that observed by other members of the class? Ask around.

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2. Make a generalization based on the combined observations of the class.

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3. What statement can you make concerning the material in the bowl of the burning candle and the candle wax based upon your generalization from above?

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4. Why do you think the substances tested on the lid melted at different temperatures?

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5. Why did the "tin" can not melt when the tin melted?

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Write a Critique for this lab.