Production of a Foam

Purpose

To demonstrate the formation of a foam from two clear solutions.

Materials

2 250 mL beakers

100 mL graduated cylinder

2 stirring rods

mortar and pestle

laundry detergent (powdered)

$Al_2(SO_4)_3 \bullet 18\ H_2O$

$NaHCO_3$

Procedure

Preparation

1. Place 1.0 g laundry detergent and 7.0 g $Al_2(SO_4)_3$ 18 H_2O in the mortar and grind it to a powder.

2. Place powder into a 250 mL beaker. Add 50 mL water and stir to dissolve. Label this Solution A.

3. Dissolve 5.0 g $NaHCO_3$ in 50 mL of water in the second 250 mL beaker. Label this Solution B.

Presentation

1. Pour A into B and mix quickly.

2. Invert the beaker to show the stability of the foam.

Additional Information

1. Reactions are:

$$[Al(H_2O)_x]^{3+} + H_2O \rightleftarrows H_3O^+ + [Al(OH)(H_2O)_{x!1}]^{2+}$$

$$NaHCO_3\ (s) \rightarrow Na^+\ (aq) + HCO_3^-(aq)$$

$$HCO_3^-(aq) \rightarrow H_2O(l) + CO_2(g)$$

2. A chemical foam contains CO_2; a mechanical foam contains air.

3. A foam is a colloidal system with a gas dispersed in a liquid.

4. Other foams include whipped cream, shaving cream.

Questions for the Students

1. What is a foam?

2. What reactions lead to the production of the foam?

3. How is this reaction similar to the reaction which produces CO_2 during baking?

4. Name some other foams.

Reference

Summerlin, L. and Ealy, J. Chemical Demonstrations: A Sourcebook for Teachers, Vol. I, 1985.