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Old Foamey

A Classic Demonstration of a Catalyst

Catalog Nos. H0037, H0008

Publication No. 398.00

Introduction:

Mix together hydrogen peroxide, sodium iodide solution, and dishwashing liquid in a tall cylinder and stand back. Your students will observe with amazement a catalyst in action as an enormous amount of soapy foam erupts from "Old Foamey!"

Chemical Concepts:

- Catalysts
- Decomposition reactions

Materials Needed:

Hydrogen peroxide, 30%, 20 mL	Graduated cylinder, 100-mL
Sodium iodide solution, 2 M, 5 mL	Graduated cylinder, 10-mL
Dishwashing liquid (such as Dove®), 10 mL	Beaker, 100-mL
Food coloring (optional)	Plastic tray, several inches deep

Caution:

This activity requires the use of hazardous components and/or has the potential for hazardous reactions. Please review the Safety Precautions section on the following page and relevant Material Safety Data Sheets before beginning this activity.

Pre-Lab:

Prepare the 2 M sodium iodide solution by dissolving 30 grams of sodium iodide, NaI, in a few mL of distilled or deionized water in a 100-mL beaker. Add water to give a total volume of 100 mL. Stir.

Procedure:

1. Place a 100-mL graduated cylinder in a plastic tray that is several inches deep.
2. Measure out 20 mL of the 30% hydrogen peroxide into the 100-mL graduated cylinder. *Caution:* Wear chemical resistant gloves and goggles when handling 30% hydrogen peroxide. Contact with skin may cause burns.
3. Measure out 10 mL of dishwashing liquid into the 10-mL graduated cylinder and add it to the cylinder containing the hydrogen peroxide. Add a few drops of food coloring, if desired. Have your students observe that little or no reaction occurs.

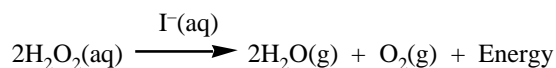
- Measure out 5 mL of sodium iodide solution using the 10-mL graduated cylinder. Quickly but carefully, add the sodium iodide solution to the 100-mL graduated cylinder.
- Step back and observe the reaction.

Tips:

- You may want to do this demonstration in the laboratory sink since there is a lot of foam produced. Cleanup, however, is easy due to the presence of extremely safe products and the generous amount of detergent.
- The cylinder will get hot, so let it cool before handling.
- This demonstration can be easily and safely scaled up for larger audiences. A 500-mL or 1-L Pyrex® graduated cylinder works well in this case. You may have heard of this demonstration also referred to as elephant toothpaste.
- Apparently the slight brown tinge of the foam at the beginning is due to the presence of free iodine produced by the extreme oxidizing ability of the 30% hydrogen peroxide.
- Another catalyst that will catalyze this reaction is manganese (IV) oxide, MnO₂.

Discussion:

This demonstration evolves a good deal of heat as shown by the steam coming off of the foam as it is produced. The reaction, therefore, is exothermic. The action of a catalyst is demonstrated. The catalyst is the I⁻(aq) ion which speeds up the decomposition of the hydrogen peroxide. The decomposition of hydrogen peroxide produces steam and oxygen gas. The oxygen gas and water vapor cause the dishwashing liquid to foam.



Safety Precautions:

Hydrogen peroxide, 30%, will act as an oxidizing agent with practically any substance. This substance is severely corrosive to the skin, eyes and respiratory tract; a very strong oxidant; and a dangerous fire and explosion risk. Do not heat this substance. Sodium iodide is slightly toxic by ingestion. Although the dishwashing liquid is considered non-hazardous, do not ingest the material. Do not stand over the reaction; steam and oxygen are produced quickly. Wear appropriate chemical splash goggles, chemical-resistant gloves and a chemical-resistant apron.

Disposal:

The foam and solution left in the cylinder may be rinsed down the drain with excess water.

Reference:

Stone, C. H. *J. Chem. Ed.* 1944, **21**, 300.

Acknowledgement:

Special thanks to Jim and Julie Ealy of The Peddie School in Hightstown, NJ.

Materials for *Old Foamey* are available from Flinn Scientific, Inc.

The above demonstration, *Old Foamey*, was developed as a Chemistry Demonstration Kit. Each kit contains enough chemicals to perform the demonstration seven times.

Catalog No.	Description	Price/Each
S0083	Sodium Iodide, 25 g	Consult Your Current Flinn Catalog/Reference Manual.
H0037	Hydrogen Peroxide, 30%, 100 mL	
C0241	Dishwashing liquid	

Catalog No.	Description	Price/Each
AP2085	Old Foamey Chemical Demonstration Kit	Consult Your Current Flinn Catalog/Reference Manual.