Instant Carnations

An Acid–Base Demonstratione

Introduction

A collection of flowers turns different colors upon spraying. Students are impressed—why are various colors obtained with different indicators? Add an aesthetic touch to your science classroom with this unusual demonstration of acid–base properties.

Concepts

- Acid–base indicators
- pH

Materials

Ammonia, 5% aqueous solution (household ammonia cleaner)
Phenolphthalein solution
Thymolphthalein solution
Universal indicator solution
Flower vase or other container
Pipe cleaners (green if possible)
2-Ply white facial tissues
Scissors
Spray bottle

Safety Precautions

Phenolphthalein, thymolphthalein, and universal indicator solutions contain alcohol and are flammable solutions. Household ammonia is a skin and eye irritant. Avoid contact with eyes and skin. Do not spray the chemicals on anyone or near any furniture. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron. Please review current Material Safety Data Sheets for additional safety, handling, and disposal information. Wash hands thoroughly with soap and water before leaving the laboratory.

Preparation

1. Open up two facial tissues and place one on top of the other.
2. Fold one half over the other half along the seam of the tissue.
3. Cut in half along the seam. This gives you four rectangular pieces, one on top of another.
4. Accordion pleat in ¼-inch pleats. Fold the small ¼-inch portion over, and take this portion and fold under until you have used the entire facial tissue. This alternates the over and under pattern. (See Figure1 below.)

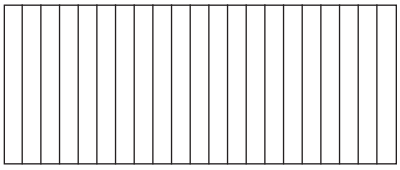

Figure 1.

5. Fasten the pleated tissues together in the middle with the pipe cleaner.
6. Separate each of the four pieces on each side of the pipe cleaner by gently pulling each ply away from the others. This will give a ruffled look.
7. Spray a flower with an indicator using a spray bottle. Alternate between indicators (allow to dry). Leave some flowers unsprayed to keep them white.
8. Place the dried flowers in a vase or other container.sured value from step 6.

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Procedure

1. Explain to students that the magic flowers need watering.
2. Spray the flowers with the aqueous ammonia solution.
3. Blowing on the flowers will cause the color to slowly disappear.

Disposal

Please consult your current Flinn Scientific Catalog/Reference Manual for general guidelines and specific procedures governing the disposal of laboratory waste. Indicators can be disposed by using Flinn Suggested Disposal Method #18b. Dilute aqueous ammonia can be poured down the drain with excess water according to Flinn Suggested Disposal Method #26b.

Tips

- Silk flowers can be used when doing a series of presentations. It is best to wash them between each use.
- Tissue flowers are easy to make and are useful when performing this demonstration for many participants.
- This is an exciting activity for young students at an elementary school or at a science center. Students can prepare a flower, spray on the indicator, and then take the flower home. The flower can also be sprayed with household ammonia or a window cleaning solution with ammonia to change the color.
- Nitrophenol, *meta* or *para*, can also be used to give a yellow color when reacted with ammonia. Phenolphthalein, thymolphthalein, and nitrophenol can also be combined to give a variety of colors.

Discussion

Indicators are weak organic acids or bases that change colors at various pH values. Indicator color changes are described in many chemistry books. Phenolphthalein solution gives a pink flower. Thymolphthalein turns the flower a very light blue. A stronger aqueous ammonia solution will give a deeper blue color. Universal indicator solution gives multicolored flowers. Blowing on the flowers shows the weak acid that exists when carbon dioxide combines with water to form carbonic acid.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12
Systems, order, and organization
Constancy, change, and measurement
Content Standards: Grades 5–8
Content Standard B: Physical Science, properties and changes of properties in matter
Content Standards: Grades 9–12
Content Standard B: Physical Science, structure and properties of matter, chemical reactions

Reference

Mattson, Bruce; Kubovy, Mary Alice; Hepburn, Jeff; Lannan, Joe. *Chemistry Demonstration Aids That You Can Build*. Flinn Scientific: Batavia, IL, 1997.

Materials for *Instant Carnations* are available from Flinn Scientific, Inc.

Catalog No.	Description
A0038	Ammonia, 64 oz
P0100	Phenol Red Indicator Solution, 100 mL
T0045	Thymol Blue Indicator Solution, 100 mL
U0001	Universal Indicator Solution, 100 mL

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.