Flaming Fingernails

A Safety Demonstration

Introduction

Synthetic fingernails represent a very serious fire hazard when working around flames.

Concepts

- Laboratory safety
- Fire hazards
- Burns

Materials

Beaker containing water
Bunsen burner
Candle or alcohol burner (optional)
Fingernail polish (optional)
Synthetic fingernails
Tongs or long forceps

Safety Precautions

Synthetic fingernails produce a very black and acrid smoke when burned. Perform the demonstration in a well-ventilated room or fume hood and extinguish the fingernail in a beaker of water to reduce the amount of smoke produced. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron.

Preparation

1. Decorate some synthetic fingernails with fingernail polish (optional).
2. Prepare a beaker of water to extinguish the flaming fingernails.

Procedure

1. Hold a synthetic fingernail with tongs or long forceps.
2. Place the fingernail in the flame of a Bunsen burner for about a second. As soon as the fingernail ignites, remove it from the flame.
3. Observe how quickly the fingernail burns.
4. Extinguish the flaming fingernail by submerging it in a beaker of water.
5. Repeat the demonstration using a candle or alcohol burner (optional).
6. Repeat the demonstration using "painted" fingernails (optional).

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures, and review all federal, state and local regulations that may apply, before proceeding. The synthetic fingernails may be placed in the trash after they are completely extinguished.

Tips

- Most popular, inexpensive, press-on or glue-on synthetic fingernails are made from ABS plastic, also called poly(acrylonitrile-butadiene-styrene). Check the back of the package for ingredients. These fingernails, which are available in most drug stores, are very flammable.
- The longer synthetic fingernails are easier to hold and will burn longer.

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- The synthetic fingernails are less dense than water and will float on top of the water. When extinguishing the flaming fingernail, submerge it in the water.
- The fingernails are more visible and realistic when they are painted with fingernail polish.

Discussion

The popular fashion trend to wear long synthetic fingernails may be a real, but unknown fire hazard to the wearer. Synthetic fingernails are made from combustible plastics. When exposed to a flame, the fingernails will readily ignite and are very difficult to extinguish. A recent study showed that synthetic fingernails ignited in less than a second with both a Bunsen burner (approximate flame temperature of 490 °C) and common birthday candles (approximate flame temperature of 300 °C). The flaming synthetic fingernails will result in severe burns to fingertips. In addition, if the wearer starts to wave her hands in an attempt to put out the fire, flaming pieces of molten plastic may be sent flying.

A complete ban of synthetic fingernails in science laboratories may be impractical. However, students (and teachers) must be aware of the potential fire hazard and take appropriate precaution when wearing synthetic fingernails around flames in laboratories and at home.

Appropriate precautions would be:

- Always use tongs or long forceps when working around flames.
- Keep fingernails away from flames.
- Light Bunsen burners using flint lighters or long butane lighters, not matches.

Reference

Vanover, W. G.; Woods, J. L.; Allin, S. B. *J. Chem. Ed.* 1999, 76, pp 1521–1522.