Foam Pumice

Overview: Pumice is a light-colored (usually white, cream, or gray) porous volcanic rock that floats in water, at least at first. Scoria is another volcanic rock, but it's darker, denser, has thicker walls, and sinks in water. Today you'll be making your own pumice using a chemical reaction.

What to Learn: Today we're making polyurethane foam, which looks a lot like pumice in that it's lightweight, porous, and cream colored. Polyurethane is a polymer that is used to make a variety of products, including seat cushions, insulation panels, seals and gaskets, roller coaster wheels, escalator rollers, carpet underlay, and wheels for skateboards.

Materials

- Two disposable plastic cups (*must* be disposable)
- Craft stick
- Tart pan
- Polyurethane A
- Polyurethane B
- Sample of pumice for observation

Experiment

1. Put on your goggles and gloves – NO EXCEPTIONS.
2. Now, move your entire experiment outside, because this experiment generates fumes that you don't want to breathe in.
3. Put the two cups in the pan.
4. Pour a couple tablespoons of polyurethane A into the first cup.
5. Pour a couple tablespoons of polyurethane B into the second cup. You need a 1:1 ratio unless otherwise indicated on your package of the product.
6. Pour one cup into the other, and stir, stir, stir! Your solution will look like honey, so keep stirring. When it starts to get cloudy and foam up, stop stirring.
7. Touch the bottom of the cup every 10 seconds with a gloved finger (do not touch the liquid itself). What do you notice?
8. After about a minute, the foam should be rising up and out of the cup. This is polyurethane foam, but don't touch it yet.
9. The foam will continue to build up until it spills out over the cup's lip. DO NOT TOUCH the foam. When the foam is reacting, you should notice heat being released by holding a hand over (without touching!) the top of the rising solution. This reaction is *exothermic* because it releases heat energy.
10. When it's cool, you can touch it with a gloved finger (it's irritating to the skin, so always use gloves). Record your observations and clean up thoroughly following the instructions for disposal on your package.

Foam Pumice Observations:

Write what polyurethane A and B looked like right after you mixed them:

Draw a "cartoon" (or sketch) of the reaction below, starting with when you combined A & B and ending with *your* reaction to the reaction:

Reading

Pumice is used to make concrete, cinder blocks, and cement. The Roman Pantheon and aqueducts used pumice as one of their construction materials. Today, you'll find pumice in polishes because it's an abrasive. It's also on the tip of your pencil as an eraser and on your toothbrush inside your toothpaste. If you've ever owned a pair of stone-washed jeans, you now know what stone was used to get that look on the pants. Beauty salons use pumice stones for pedicures and chinchillas use powdered pumice to bathe in, since they don't like to get wet.

Exercises

1. Name three characteristics of pumice.
2. How is pumice different from scoria?
3. What can you use pumice for?

Answers to Exercises: Foam Pumice

1. Name three characteristics of pumice. (light-colored, floats on water, and is porous)
2. How is pumice different from scoria? (Scoria is darker, larger holes, thicker walls, denser, and sinks.)
3. What can you use pumice for? (Getting dead skin off your heels.)