kidsCorner

How to Make Your Own Version of GAK™ at Home

Did you ever wonder how Gak™ is made?

With this simple experiment, you can make your own version of this popular sticky, squishy, fun ball and learn why polymers are an important ingredient in so many products you use every day.

Learn about Polymer Principles in Everyday Living

THE EXPERIMENT

Materials Required

- 20 Mule Team' Borax™ (available in the detergent aisle at stores like Target or Wal-Mart)
- Elmer's™ Washable School Glue
- Stirring Rod or Popsicle Stick
- Plastic Cup (7 or 9 oz.)
- Teaspoon Measure
- Food Coloring (optional)
- Lid or Plastic Bag for storing Gak™

Procedure

1. Prepare the borax solution: dissolve one level teaspoon of boraxin 1 cup (8 oz.) of hot water and stir vigorously. Let the solution stand for 1-2 minutes and re-agitate until the solid is completely dissolved. (A small amount of sediment on the bottom will not create any problems). Set the borax solution aside.
2. Measure out slightly more than _ cup of Elmer's Glue™ into a plastic cup. Add food coloring (2-3 drops) to the glue, if desired, and mix well until uniform in appearance. Add two teaspoonfuls of the borax solution into the Elmer's Glue™ and mix rapidly with a stirring rod or popsicle stick. Continue stirring the mixture until all the borax solution has reacted with the glue and it becomes thick and stringy. Congratulations, you've made Gak™!
3. Gak™ may be sticky initially but will become less tacky after repeated handling. Store Gak in a sealed jar/container to insure "freshness" and protection from very young children. Gak™ should stretch and flow relatively easily but will typically break apart if pulled hard. Gak™ will dry out and gradually become less elastic after handling and exposure to air. It can be rehydrated by adding a small amount of water before or after each use.

Safety Precautions

Borax (sodium tetraborate decahydrate) is moderately toxic in quantities of more than 1 gram/1000 grams of body weight. Do not ingest. Wash off any borax contacting hands or skin. Wash hands after handling Gak™.

Do not allow Gak™ to remain in direct contact with clothing, upholstery or wood surfaces for an extended period of time. Clean up any spilled Gak™ immediately. (Gak™ can be removed from carpets, furniture, etc. by simply washing with soap and water).

Polymers you use every day

A similar approach is used to thicken commercial household cleaning products, detergents and personal care products such as skin cream. Polymers are used to thicken the liquid hand soap you find in public and private bathrooms and the automatic dishwashing gel that you squeeze into the dishwasher. Polymers are typically included in personal care products to add thickness to the skin cream you apply to your face and hands so it doesn't run off before you can rub it in! Other thickeners made with polymers help to make cleaning products more effective on hard surfaces, such as toilet bowls, because they allow the product to stick to the surface longer.

Understanding the Science

Elmer's Glue™ contains a high molecular weight polymer, a long chain of repeating chemical units (based on vinyl acetate). If you could see them, these polymer chains would look like a long piece of thread that you would find in a sewing kit. The borax solution converts the polyvinyl acetate used in Elmer's Glue™ into a very thick, elastic material by "cross-linking" the polymer.

What is cross-linking? Imagine dozens of individual strands of thread hanging down from an object. Now run a series of threads across from left to right, connecting the individual fibers together. The more contact points you connect, the more the individual threads act like a single garment. When you pull on one end, the entire fabric moves as one. When you combine Elmer's Glue™ and borax, you create a material that is somewhat elastic and flows or pours very, very slowly.

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