M² Polymer Technologies, Inc.

P.O. Box 365
West Dundee, IL 60118 USA
Phone: 847-836-1393 Fax: 847-836-6483
www.m2polymer.com

Science Projects

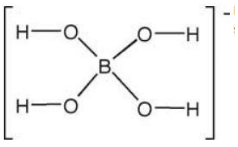
GAAKK RECIPE (Cross-linking of Polyvinyl Alcohol)

Difficulty: **Easy**

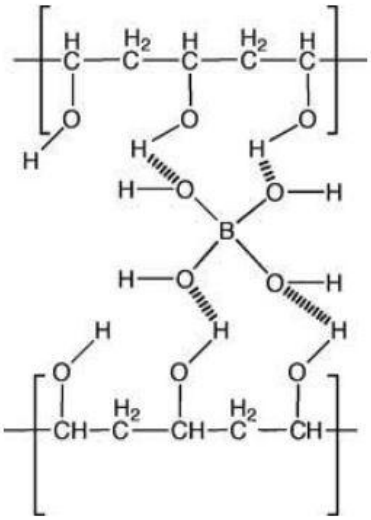
Safety Equipment Needed: **None**

Principal: White school construction glues are made of polyvinyl alcohol. Addition of concentrated Borax solution builds bridges between the polymer chains, cross-linking them and turning the mixture into a highly viscous semi-solid blob…. Like a giant booger.

Polyvinyl Alcohol has repeating units of: $[-- CH_2 – CH(OH) - CH_2 – CH(OH) --]_n$

Borax is $Na_2B_4O_7 \cdot 10H_2O$ and looks like this when ionized:  $+ 2 Na^+$

Mix the two together and you get this:



Materials:

Bottles of *Elmer's* white glue
Box of *Borax Booster* (*20 Mule Team Borax* - get the smallest box you can find)
Plastic mixing bottle (8 to 64 oz)
Eyedropper
Dixie cups (small size/shot glass size)
Food coloring
Stirring sticks
Paper Towels

Directions:

Take the plastic mixing bottle and add about ½" of the Borax powder to the bottom. Fill bottle 3/4s full with warm water. Cap and shake vigorously. Let solution settle. You want a super-saturated Borax solution so there should be powder remaining on the bottom of the bottle after shaking. If there is not, add some more Borax and shake again.

Take a Dixie cup and fill about ¼ to 1/3 with Elmers Glue. Add a couple of drops of food color (optional). Take the eyedropper and fill with Borax solution. Add 5-10 drops to the Dixie cup and stir with stirring stick. Keep adding Borax until glue gets all "snotty" and excess liquid is in cup.

Stir until the mix turns into a well mixed glob of gooey stuff.

Decant off any excess liquid and remove the GAAKK from the Dixie Cup. Gently pat dry with paper towel to remove excess Borax solution.

Enjoy the grossness of your creation!