

Materials Science – Slime!

Concept: Formation of a loosely cross-linked polymer gel using hydrogen bonding.

Objectives: The student will observe the formation of polymer gel and test the variability of reactions based on % reactants.

Materials

- 40 ml of 4% PVA (poly vinyl alcohol) in water
- 4-6 ml of 4% sodium borate solution
- plastic bags
- food coloring

Safety Cautions

- Wear protective safety glasses.
- Do not taste slime.
- Do not put materials back into the bottles (this may contaminate contents).

Procedure

1. Pour about 40 ml. of the 4% PVA solution into a plastic bag.
2. Add about 4 ml. of the 4% sodium borate solution and knead it in the plastic bag. Have one student try 5 ml, another 6 ml.
3. (Optional) Add ONE drop of food coloring
4. Remove the "blob" from the bag and knead it. Then play with the "blob" and observe its different properties
5. Stretch the gel slowly, and then try stretching quickly. Notice the different responses. Allow the gel to hang freely and note how it flows.

Wash hands when finished. (Students can handle slime but be sure that they do not eat it or feed it to anyone else! Also, they should wash their hands when finished!)

Observations

1. Does the food coloring affect gel formation?
2. If either ingredient is warmed or cooled, will gel formation differ?
3. Compare with other teams. Explain how changing the percentage of sodium borate amount changes the gel?
4. How long does it take for your slime to ooze out of shape when you set it down?

Note: It is sometimes difficult to purchase these materials - especially in small amounts. The instructor has some packets of materials available, good for 500 ml of PVA and 50 ml of sodium borate. This "lab pack" is available for \$2, and covers the cost of materials. Limit one per person - there are only 21 packs available.

For mixing, follow directions on the handouts:

- 20g of PVA in 500 ml water
- 2g of sodium borate in 50 ml of water

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