

University of Utah Chemistry Demonstration:

SAFETY

acetone.....flammable

Disappearing Styrofoam

Reagents:

~ 500 mL acetone

Styrofoam product (cup, polystyrene peanuts (packing peanuts), large pieces, etc.

Optional: starch based packing peanuts

H₂O (does not need to be distilled)

Instructions:

- Pour acetone into shallow dish or something similar. Having the container clear allows for the experiment to be viewed from the side.
- Gently depress the Styrofoam into the acetone, and it will “disappear.”

Note: Many variations can also be performed with different Styrofoam products. You can also show the difference between the Styrofoam in acetone and water. Also, if you would like to use *starch* based packing peanuts you can show how these peanuts will dissolve in water, but not in acetone. For the starch based peanuts use a container with a top. Shaking the peanuts in the flask will help them to dissolve.

Disposal: Dispose acetone in a proper waste container. Try to gather the excess Styrofoam from the acetone in a paper towel and throw in the trash.

Remember that likes dissolve likes. Acetone is a relatively non-polar solvent (as compared to water, which is highly polar), and Styrofoam is made from polystyrene and foam. Due to their similar polarities, acetone can dissolve the carbon-hydrogen bonds of Styrofoam. In return, the starch based peanuts are soluble in water because of the polar hydroxyl groups. Water and starch share the same properties (they are both highly polar), while water and Styrofoam have opposing properties.

The same principles can be used to explain how acetone removes fingernail polish. It is interesting to note that acetone is the main ingredient in nail polish. Because of the other ingredients in nail polish, the polish changes from a liquid into a solid when applied to the nail. When acetone (nail polish remover) is applied to remove the polish, the nail polish is turned back into its liquid state. This is because acetone is present in both nail polish remover and nail polish. You can see that the polish does not disappear when acetone is used. When you wipe off the polish, it remains on the cotton ball.