### Required Training

UC Lab Safety Fundamentals

### Required PPE

Lab coat, safety glasses/goggles, nitrile gloves

### Equipment

Three 500 mL beakers

Paper Towels

Matches

Metal Pan

### Chemicals

Solution A: 6 g Calcium Acetate in 50 mL DI water

Solution B: 150 mL 100% Ethanol

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### Procedure:

1. Pour solution A into solution B. Immediately a gel will form inside the beaker.
2. Over another beaker (to catch excess ethanol), remove the gel and shape it into a ball being sure to squeeze out excess ethanol. Set aside the beaker (away from flammable items like paper items)
3. Replace gloves after handling the “snowball.” Set the snowball in the metal pan.
4. Students can touch the “snowball” to feel the texture and temperature.
5. Light the ball on fire. The ball will burn for around 20mins.
6. Extinguish the flame with an inverted clean beaker.

### Discussion:

The physical change of the two liquids forming a gel is due to the over-saturation of calcium acetate. The calcium acetate molecules are polar and readily dissolve in polar water. When the saturated solution is mixed with ethanol (with its non-polar ends), the acetate molecules cannot remain solubilized and form a gel. The calcium acetate solid structure traps ethanol fuel inside it. Once ignited, the ethanol reacts with oxygen to create a flame. This gel is similar to Sterno in concept (it uses a different a gelling agent and also uses methanol). This reaction volume will burn for about 20 minutes.

### Hazards:

Be extremely careful not to drip ethanol on anything near an open flame or source of ignition. Be careful not to burn your hands by handling the snowball with wet bare hands. Ensure there are fire safety measures in your classroom.
Disposal (by Storeroom):

Bring all dirty glassware and the remaining gel back to the storeroom for immediate disposal. The dispensary will wash all the glassware promptly and wash the excess gel down the drain with copious amounts of water.