

# CRYSTAL GROWING

## ALUM (ALUMINUM POTASSIUM SULFATE)

### GROWING SEEDS

#### Materials

- Distilled or purified water
- Alum (aluminum potassium sulfate) (potassium alum)
- Ringstand for filtering
- 3" funnel
- Medium porosity chemical filter paper (not coffee filter)
- Petrie dish

1. Weigh 15 g/100 ml water in solution (400 ml water recommended)
2. Volumetrically measure the water into a beaker or cup.
3. Heat the water to 50-60° C to speed dissolving the alum.
4. Add the pre-weighed alum.
5. Stir gently until all the alum is dissolved.
6. Cover to keep clean and allow the solution to cool to room temperature.
7. If, at room temperature, there are some crystals at the container's bottom, the solution is correctly saturated.
8. Now filter, using the chemical filter paper, into a *clean* sealable container, i.e. clean drinking water bottle rinsed with purified water.
9. Pour a small amount of the solution into a Petrie dish (about  $\frac{1}{2}$  the dishes' height). Store the rest of the solution in a sealed container.
10. Place 2 rods across the open Petri dish to act as spacers for air to flow across the dish so the solution can evaporate leaving small crystals in the dish.
11. Cover using the dish cover and a coffee filter to insure cleanliness.
12. Store the dish in a *constant temperature* environment.
13. Allow the water to evaporate completely. What is left are the seeds.

# GROWING THE CRYSTAL

## MATERIALS

- Pre-made saturated alum solution (see 'growing seeds')
  - 400 ml beaker or clean cup
  - Nylon fishing line
  - Clean rod
  - Cover for beaker i.e. coffee filter, to allow controlled slow evaporation.
  - 'Seeds'
1. Select a large, clear, well formed seed crystal. Use plastic gloves or tongs. **Do Not Use Unprotected Fingers.**
  2. Tie string around the 'seed'.
  3. Suspend the 'seed' so that it is immersed in the middle of the solution by tying the other end of the line to a bar across the top of the beaker. Do not let the seed touch any part of the beaker.
  4. Add the clear saturated solution to the beaker so that the seed is immersed in the center.
  5. Place the beaker in a **constant temperature** facility. Fluctuating temperature can destroy the crystal growing process.
  6. Cover with a coffee filter to maintain cleanliness.
  7. Check the growing crystal regularly. Add saturated solution as needed to keep the crystal covered with solution.
  8. If dirt or other crystals appear in the solution or on the beaker walls or bottom, remove the crystal and filter the solution again with a chemical filter before continuing with a fresh clean beaker.

# RECORD KEEPING

## LABORATORY LOG BOOK

**A COMPLETE RECORD OF THE CRYSTAL GROWING PROCESS IS REQUIRED. THE FOLLOWING IS THE STANDARD LOG BOOK FORMAT. ENTER THE INFORMATION IN THE LOG WHEN YOU DO IT. DO NOT PUT IT ON A SCRAP OF PAPER FIRST.**

**INTRODUCTION-** Background about crystals, what is known about the procedures, and what are the general objects of the experiments.

**SPECIFIC OBJECTIVES/HYPOTHESIS-** Exactly what are you going to produce. What are the characteristics of your crystal going to be?

**MATERIALS and EQUIPMENT-**What materials did you use in the project?

**PROCEDURE-** Exactly what procedure did you use? Include weights, volumes, materials, etc. Write the procedure steps in exact sequence you performed them. At any time you do something you must make note of it in the log book **AT THE TIME YOU DO IT** and date it.

**RESULTS-** The best way to keep track of your results is to make a table so that all the important data is in one place. All the columns must be identified first. For the crystal you might want to record date, elapsed time, weight, volume, and observations.

After you finish collecting the data, you will analyze it by drawing graphs or charts.

**CONCLUSIONS-**Did you meet you specific objectives? Show evidence from your experiment. If not, what do you think went wrong and how would you correct it in the future?