

Crystal Growing Kit Instructions



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Introduction

When followed closely, these instructions will provide an innovative, fun, and easy way to grow beautiful crystals in just a few days!

The following materials are included in this kit:

- 4 clear plastic crystal growing dishes
- 10 crystal growing papers
- 1 bottle of Potassium Ferricyanide
- 1 bottle of Cupric Sulfate

Preparation

Clean and dry the four small plastic dishes before you begin. Only the bottom halves of the dishes will be used for crystal growing; the shallow tops can be discarded. You will need four of the growing papers for this experiment (using four different colors makes observation easier later on). Each paper has a little “handle” – bend this handle up so that the paper circles will fit inside the dishes. Set two papers and two dishes aside for later. Now you’re ready to begin growing crystals!

Safety

Carefully read the handling instructions on each of the chemical bottles before proceeding.

Saturated Solutions

1. Put $\frac{1}{4}$ cup (60ml) of water into a small glass beaker or heat-resistant, glass measuring cup. Microwave on high until the water is near a boil (about 30 seconds). Carefully open and pour the contents of about half the bottle of **Potassium Ferricyanide** into the hot water, stirring with a **plastic spoon** or other disposable stirring utensil. Stir the solution until no more chemical will dissolve (you may have to keep adding a little more chemical if it is all dissolved the first time). When you can no longer dissolve any chemical in the solution, you have made what is called a **saturated solution**. There should still be tiny pieces of chemical collected at the bottom of the dish – it may be hard to tell when it has all dissolved since the solution is dark and not



transparent. (Be sure to clean up any spills immediately as both of the chemicals you will be working with stain surfaces easily!)

1. Once your solution is saturated, fill each of the dishes just over $\frac{1}{2}$ full (about 20ml). Place a growing paper on the surface of the solution in each dish and set them gently aside, being careful not to let any liquid get on top of the papers. (The edges of the papers might curl up because the solution is so hot, but they will relax as it cools.)
2. Rinse and dry your mixing cup and spoon well, **then repeat steps 1 and 2** with the **Cupric Sulfate** in the two remaining dishes. (**Hint:** It is easiest to dump the chunks onto a paper towel first and then scoop them into the solution one at a time.) When you're done, carefully transfer your crystal dishes to a spot where they won't be bumped or disturbed as they grow.

As the water in the saturated solution evaporates, crystals will start to form on the slits of the under side of the papers within about 2 days. To **observe growth**, hold the dishes up to a light. After about 2-6 days, your crystals should be large enough to take out and **examine**. Gently peel the papers out of the dishes and set each one, with the crystals facing up, on a folded paper towel to dry. There will be some solution and probably some small crystals left in the bottom of the dish. Carefully remove any crystals from the dish with tweezers and dip them in a glass of water to rinse them off before placing on the paper towel to dry.

Additional Experiments

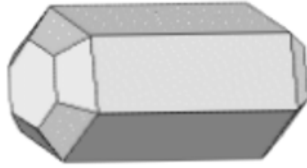
The four plastic growing dishes included with this kit can be reused numerous times, and there are enough additional papers to do some experimenting on your own. It is a good idea to label each paper as you experiment to help keep track of the changes you make to each. You might want to just put a number on the papers and then put other information such as the date, how full the dish was filled, etc. into a notebook for reference when you observe your crystals later on. Here are a few things you might try with additional batches of crystals:

- 1) Cover one dish with a small square of paper; leave the other uncovered and note the difference in growth rate between the two dishes. **How does the paper over one dish change the water evaporation and crystal growth rates?**
- 2) Another idea is to fill one dish $\frac{3}{4}$ full of solution instead of just $\frac{1}{2}$ full. **Which one makes larger crystals? Which dish takes longer for crystals to form?**

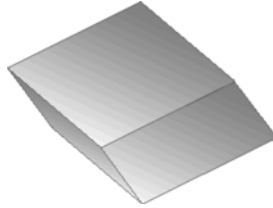
Epsom salt, rock salt, and table salt can all be used to grow crystals as well. Using 4 teaspoons of salt, follow the same directions as for the chemicals provided with this kit.

Crystal Shapes

Potassium ferricyanide generally forms hexagonal shaped crystals with faceted ends that look something like this:



Cupric sulfate forms crystals with a rhombohedral structure like this:



You should be able to identify the crystal shapes just by looking at them with the naked eye; however, if you have a low power microscope or a good magnifying glass you will be able to see more details of the crystal structure. You might also want to draw what you see in a notebook or science field book; be sure to label your drawings for future reference.