



# Growing Crystals at Home

<http://iycr2014.org/>

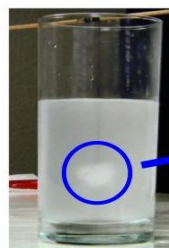
It is relatively easy and fun to grow crystals of common chemicals at home with a minimum of time and effort. Three of the favorite crystals to grow at home are alum (a common spice that can be obtained at most grocery stores), Borax (common detergent), and copper sulfate (used as a root killer). Crystals grow by a process termed *nucleation* from saturated or supersaturated solutions.

Step 1: Buy Alum at grocery store



Step 2: Make a saturated solution

Step 3: Grow seed crystal

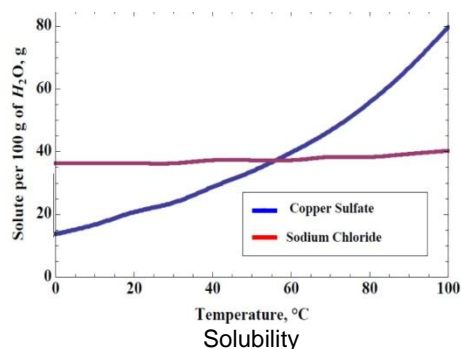


Step 4: Add seed crystal to saturated solution to continue its growth

Alum crystal

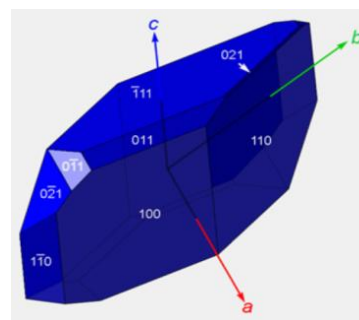


*How much material it takes to make a saturated solution depends on the solubility of the substance. Most materials are more soluble in hot solutions, but the range varies a lot. For example, the solubility of common table salt (NaCl) increases by less than 10% between room temperature and the boiling point of water, whereas the solubility copper sulfate increases by over 4-fold over this same temperature range (see graphs below taken from Ref.1 Dom's crystal growing webpage:).*



Salt (NaCl) Crystals

NaCl  $Fm\bar{3}m$ ,  $a = 5.64 \text{ \AA}$



Copper Sulfate Crystal

$\text{CuSO}_4$   $P1$  ( $Z = 2$ )

$a = 6.11 \text{ \AA}$ ,  $b = 10.71 \text{ \AA}$ ,  $c = 5.96 \text{ \AA}$

$\alpha = 82.4^\circ$ ,  $\beta = 107.3^\circ$ , and  $\gamma = 102.6^\circ$

There are many web links and *youtube* videos to show you how to grow crystals at home. Below are just a few links to detailed steps on how to grow crystals at home. The alum crystal shown below at right was grown in less than 2 days.

\*\*\*\*\*

References:

Dom's crystal growing webpage: <http://www.homepages.ucl.ac.uk/~ucfbanf/general/crystal.htm>

About.com / chemistry / crystal facts: <http://chemistry.about.com/od/crystalfacts/>

About.com / crystal recipes: <http://chemistry.about.com/od/crystalrecipes/>

Borax snowflake crystals: <http://video.about.com/chemistry/Borax-Crystal-Snowflakes.htm>

Large Alum crystals on youtube: <http://www.youtube.com/watch?v=RnjiEdoSEvA>

Sodium acetate supersaturated solutions: <http://www.youtube.com/watch?v=D1PDE5Oawul>

Alum Crystal

