



# **Crystal Investigation: Crystallised**

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# CRYSTAL INVESTIGATION

## Investigation Question

Will the consistency of solution filtering impact the clarity and smoothness of the crystal?

## Hypothesis

It is hypothesised that if the crystal is kept in a consistently filtered solution, whilst also being in a constant temperature and environment it would result in a more clear and smooth crystal.

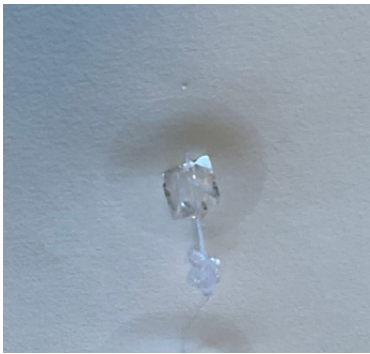



## Method for Growing Alum Crystals

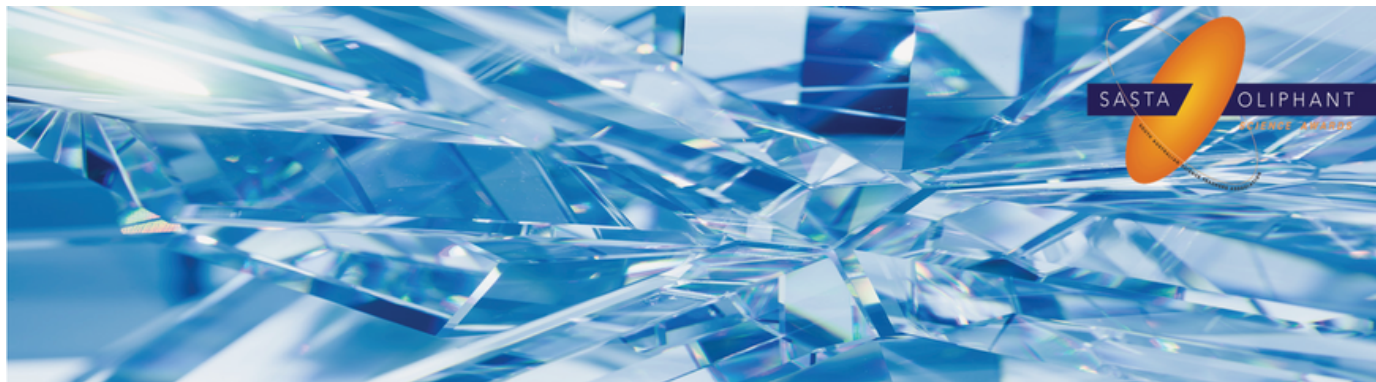
- Weigh out approximately 10g of alum (or 1 tbs) and place the alum into a clean 250ml beaker. For each gram of alum in the beaker, add 7ml of clean water.
- Heat the beaker to approximately 60°C and stir the mixture until all alum is dissolved. If the mixture is cloudy, let the beaker stand to allow the matter to settle.
- Decant the solution into a new clean 250ml beaker
- Tie a piece of thread to a pop stick and place in the solution, making sure that at least 1 cm of the thread is submerged. Place a piece of filter paper on top of the beaker and place the setup into an incubator set at 24°C. Small crystals will form on the thread and the bottom of the beaker.
- Remove the thread after a week. Keep any good crystals and remove the rest, however, do not discard of them. Attach the good crystal to a thread and tie the thread to another popstick. A good crystal is identified by an octahedron shape.
- Place the popstick with the crystal attached on top of the beaker and cover it with filter paper. Place the filter paper setup on the beaker, making sure the crystal is fully submerged in the solution. Place it in the water bath, and filter the solution/make more solution weekly.

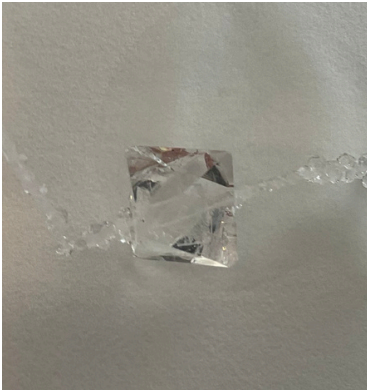


## Method to Filter the Solution

- Take the crystal out of the beaker with the solution.
- Using a tripod as a stand, place a clean funnel on top of the tripod. Inside the funnel, place a large piece of filter paper.
- Place a new and clean 250ml beaker under the funnel and begin pouring the solution into it.
- The new solution should be filtered through the filter paper.



Date/Time	Description of what the student did, problems encountered and solved.	Crystal Characteristics	Photos
22-5-24 9 AM - 10 AM	I chose and planted some previously prepared seed crystals onto a thread using glue and placed the pop stick on top of a 250ml beaker filled halfway with solution. I had difficulty in gluing my chosen seed crystal onto the string attached to the popstick, however, with the guidance of a teacher, I was able to successfully glue the crystal.	The seed crystal is small and hard to see. However, its clarity and smoothness provide evidence of its potential.	
29-5-24 9AM - 10AM	I filtered the solution and removed any excess growth on top and bottom of the crystal to ensure that it remains smooth and clear. After filtering the solution, I added the crystal back into the solution, ensuring that it dropped 2cm under the water line.	The crystal was bigger than last week and looked clearer. However, it did not have clean cut corners yet.	
5-6-24 9AM - 10AM	I filtered the solution twice using filter paper and a tripod. This was done twice as mould had started to form in the solution, rendering it cloudy. First I was confused about what to do with mould, however, after some research, I realised that it could easily be filtered out.	The crystal looked even clearer, and the corner and edges began to develop a clear distinct edge.	
12-6-24 9AM - 10AM	I spent the majority of this session cleaning any outgrowth of the crystal, ensuring it has the perfect shape. This was done using tweezers which allowed for accuracy and precision when breaking the outcroppings. When the crystal had met my satisfaction, I placed it back into the filtered solution. I was consistently filtering the solution every session to test my hypothesis.	The crystal looked cleaner as the edges were sharper and any outgrowths had been cut off. It was also bigger.	



<p>19-6-24 9 AM - 10 AM</p>	<p>I filtered the solution and added the crystal back to the solution. Before doing that, I also made sure that there was no mould resurfacing in the solution. I could not spot any mould, therefore I placed the crystal back into the solution.</p>	<p>The crystal was bigger and clearer. However, the rate of its growth had slowly diminished over the past couple of weeks.</p>	
<p>26-6-24 9AM - 10AM</p>	<p>A lot of mould had unexpectedly grown in the solution, therefore with the help of our OSA Coordinator, I created new solution which was clear and optimal for the finishing stages of the crystal. This was done by following the method outlined in the beginning of this logbook.</p>	<p>The crystal's size remained the same, however, its clarity was higher and its edges were sharper.</p>	
<p>3-7-24 9AM - 10AM</p>	<p>This was the last week of crystal growing and I wanted to perfect the edges of the crystal. By using the tweezers, I cleaned of any small outgrowths on the crystal, giving it a clean look.</p>	<p>The crystal size remained the same. The clarity of the crystal was also similar. However, the edges were a lot cleaner and sharper due to my tweezer-work.</p>	

**Conclusion**

By consistently filtering the solution, the outcome was a large, clear, and sharp edged crystal. The key to such a crystal is consistent cleaning of the solution, ensuring that no mould or cloudiness is present.