



Prize Winner

Crystal Investigation

Year 3-4

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Crystal Investigation

By Lucy Hawkes

Hypothesis

A crystal grown in a dark quiet space will grow clearer and better formed than one grown in a busy, noisy and bright environment.


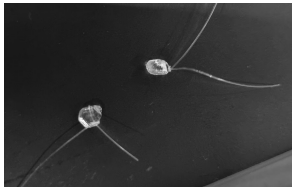

Materials used

Aluminium potassium sulphate
Distilled water
Measuring jug
Scales
Saucepan
Stove
Metal spoon
Thermometer
Glass jars
Flat shallow glass dish
Fishing line
Chopsticks
Digital callipers

Method

1. Dissolved 100g of aluminium potassium sulphate (alum) in 800ml of distilled water by heating in a saucepan on a stove to 50°C.
2. Poured solution into a flat, shallow glass dish and set aside until seed crystals form. The solution was checked daily.
3. Once seed crystals were large enough (3-4mm) I selected 2 and tied them to fishing line then attached them to chopsticks. The solution was heated to dissolve the rest of the seed crystals and poured into 2 identical jars.
4. Once the solution cooled down to room temperature, I suspended the crystals in the jars. Crystal A was placed in a dark cupboard while crystal B was left on the kitchen bench.
5. I checked them regularly and recorded what happened in the log book below.
6. There were a few times that there were lots of extra crystals forming in the jar so I removed the large crystal, reheated the solution to dissolve them and once it had cooled replaced the large crystals in the jars.

Log book

Date	Observations	
25/02/2023 (Day 1) 1:00pm	Step 1 and 2 of method performed. 	
26/02/2023 (Day 2) 2:00pm	No crystals formed and the solution is clear.	
27/02/2023 (Day 3) 7:30pm	Some seed crystals have started to form. Will leave to allow them to get bigger.	
28/02/2023 (Day 4) 7:30pm	Seed crystals are larger today. Larger ones 2-3mm. I will leave them for one more day.	
01/03/2023 (Day 5) 7:00pm	Seed crystals are good size now. Starting to crowd the bottom of the dish. Removed 2 of the larger seed crystals to grow and attached them to fishing line. 	
	Crystal A [Dark cupboard]	Crystal B [Kitchen bench]
4/03/2023 (Day 8) 2:30pm	Size: 19.5 mm Shape: Diamond shape with some flat points and some sharp points. Clarity: Cloudy where the fishing line is but clear everywhere else. Notes: about four large crystals at the bottom. Four small crystals are growing on the top of the fishing line.	Size: 13 mm Shape: Diamond shape with flat points. Clarity: The middle is cloudy and outside is clear. Notes: Many (maybe even one hundred) small crystals in the base of the jar. One crystal is growing on the top of the fishing line.
12/03/2023 (Day 16) 2:00pm Due to the large amount of crystals in the bottom, heated each solution separately to dissolve extra crystals. Once the solution cooled to room temperature, I returned the crystals to the jars.	Size: 25.2 mm Shape: Diamond shape with most flat points and some sharp points. It has 8 triangular shaped faces that are fairly even. Clarity: Cloudy where the fishing line is but clear everywhere else. Notes: about four large crystals at the bottom and lots of little crystals as well.	Size: 13.1 mm Shape: Diamond shape with some rounded points and some flat points. Clarity: Cloudy at the top and middle, clear at bottom. Notes: The entire base of the jar is covered with crystals. Some crystallisation around rim of the jar and top of fishing line.
		

<p>19/03/2023 (Day 23) 1:30pm</p>	<p>Size: 31.4mm Shape: Diamond shape with most flat points and some sharp points. It has 8 triangular shaped faces that are fairly even. It is well formed. Clarity: Very clear on outside but where fishing line is slightly cloudy. Notes: There are no extra crystals at the base of the jar.</p>	<p>Size: 17.5mm Shape: Diamond shape with most flat points and some curved points. It has 8 triangular shaped faces that are fairly even. It is not well shaped. Clarity: All cloudy but more on the outside of the crystal. Notes: There are lots of extra crystals at the base of the jar that are quite small. The crystal has ripples in it.</p>
<p>26/03/2023 (Day 30) 3:00pm</p> <p>Due to the large amount of crystals in the bottom, heated each solution separately to dissolve extra crystals. Once the solution cooled to room temperature, I returned the crystals to the jars.</p>	<p>Size: 31.5mm Shape: Diamond shape with most flat points and some sharp points. It has 8 triangular shaped faces that are quite even. It is nicely formed. Clarity: Very clear on outside but where fishing line is slightly cloudy. Notes: There were a few small crystals on the bottom of the jar and one crystal forming on top of the string.</p>	<p>Size: 17.6mm Shape: Diamond shape with most flat points and one curved point. It has 8 triangular shaped faces that are fairly even. It is well formed. Clarity: Very cloudy everywhere. Notes: There were lots of extra crystals at the base of the jar but no crystals have formed on the string.</p>
<p>02/04/2023 (Day 37)</p>	<p>Size: 32.5mm Shape: Diamond shape with most flat points and some sharp points. It has 8 triangular shaped faces that are quite even. It is nicely formed. Clarity: Very clear on outside but where fishing line is slightly cloudy. Notes: There were a few small crystals on the bottom of the jar and no crystals forming on the string.</p>	<p>Size: 24.7mm Shape: Diamond shape with most flat points and some rounded points. It has 8 triangular shaped faces that are quite even. It is well formed. Clarity: All cloudy but it has started to grow clear on the outside. Notes: There were a lot of small crystals on the bottom of the jar and lots of clear crystals on the string.</p>
<p>07/04/23 (Day 40)</p> <div> </div> <p>Because the crystals haven't been growing that much I have decided to end the experiment.</p>	<p>Size: 32.9mm Shape: Still same diamond shape with sharp edges and mostly smooth surfaces. Some of the corners are flat, some sharp and some round Clarity: Mostly clear with a few cloudy patches. Notes: There were only a few small crystals on the bottom of the jar and there are no crystals forming on the string.</p>	<p>Size: 24.4mm Shape: Diamond shape with most flat points and some rounded points. It has 8 triangular shaped faces that are quite even. It is not very well formed. Clarity: All cloudy and it has rough surfaces. Notes: There were a lot of different sized crystals on the bottom of the jar.</p>

Evaluation and analysis

The results of my crystal investigation proved that my hypothesis that a crystal grown in a dark quiet space will grow clearer and better formed than one grown in a busy, noisy and bright environment. The crystal grown in a dark cupboard was 32.9mm and was very well formed and was diamond shaped. It was smooth and transparent with some imperfections. The other crystal was much smaller at 24.4mm and had rough surfaces. It was not very symmetrical and was really cloudy.

The cupboard my crystal was in was just in my lounge room so there would have been hot days and cold days and sometimes it would be noisier or quieter. This would have impacted my project and I might have produced a better crystal if I had a room with a constant temperature and a quieter place to store it. I might have made two bigger crystals if I used 100g of alum for each instead of separating them into 50g and 50g each.

Acknowledgements

During my investigation I had help from my Mum with pouring hot liquids and heating things up on the stove.

I used these youtube videos by Dr Jason Benedict for instructions on how to grow a crystal.

<https://www.youtube.com/watch?v=gsC039jpOT0>

https://www.youtube.com/watch?v=_0F0l3XKiOY