Practical investigation - Crystallisation

Make crystals from a water solution and see why understanding crystallisation is important to monitor and manage our water.

Need some lesson ideas? Our High school webpage has syllabus linked lesson plans to support this experiment.

Why is important we understand crystallisation when we treat your drinking water?

Water is an excellent solvent. It picks up particles, salts and minerals as it flows through the natural water cycle. These salts and minerals are called solutes. When there are too many solutes, crystals can form. Crystals are solids with a highly ordered structure.

In drinking water, too many solutes can leave a bad taste, make water cloudy or block pipes with limescale crystals. Every day we filter, treat, test, and correct solutes to provide clean, safe water, so we don't get crystals!

Did you know?

We test over 70 parameters to meet Australian Drinking Water Guidelines. Find out more on our Water quality & filtration and Water analysis webpages.

Today, we'll explore what too many solutes in water can do. We will make solutions that can form crystals.

What you'll need?

Safety first! Adult supervision is required. Follow all safety instructions as directed on product packaging.

- 1.5 L tap water
- heat-proof jars or cups
- 250 g solute(s): sugar, salt, Epsom salts, bicarb and/or washing soda
- measuring cup
- kettle or hot plate
- marker
- food colouring
- dropper
- spoon
- sticks or pencils
- string or twine
- scissors

Example of materials for your experiment

Activity

1. Make sure your jars are clean. Label your jars with a marker.
2. Boil water with a kettle or hot plate.
3. Pour 1 cup (250 mL) of the hot water into a clean jar.
4. Add a spoon of a solute, quickly stir, and see if it dissolves. If it dissolves, add another spoon. Tally the number of spoons you add. Continue until the water can no longer fully dissolve the solute– this is called a "saturated solution". Leave at least one spoon of undissolved solids.
5. Put a couple drops of your desired food colouring into the jar and stir.
6. Repeat steps 2 - 5 for all the solutes you choose. Leave one jar with tap water only to compare.
7. Tie a length of string to a stick or pencil. Place the string into the jar, poke the string to get it wet and fall in place. Rest the stick or pencil on the opening of the jar. Repeat for all the jars.
8. Place jars on a windowsill or stable flat surface that won't be disturbed.
9. Be patient and record observations according to the time in the results table.

Step 4

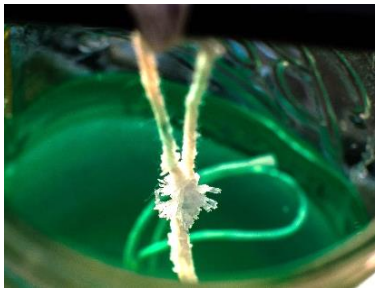
Step 5

Step 7

Step 8

Extension Activities

- What happens if you change the temperature of the water?
- What happens if we lowered the concentration of the solute?
- Are there other household items you can use to make crystals with?
- Can the crystal grow on other surfaces? A sponge? A rock?
- What happens if you mix the solutions together?



Small crystals form after a few days

Results

Write your crystal and solution observations in the table below:

Time	Solutions and observations					
	Tap water					
No. of spoons to saturate	0					
one day						
one week						
two weeks						
one month						

Discussion

- What and why are controls used in experiments?
- Were all your solutes equally soluble? How could this affect how we store and use solutions?
- Did all the crystals look the same? Take the same time to grow? What could make them grow faster?
- Why do you think it is important we understand crystallisation when we treat your drinking water?

Want to know more?

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