Melting and Crystallising - Student Activity

When rocks melt due to increased pressure and heat within the Earth, they rearrange their molecules to form crystalline minerals that are stable under those particular conditions. Sediments may recrystallise to form granites.

This orbicular granite is from Western Australia. Its minerals became arranged in highly unusual patterns when they crystallised. We still do not understand how this could occur!

BEWARE! People commonly confuse melting with solution. The processes are different.

Your teacher is going to demonstrate two examples of solution.

Demonstration of sugar ($C_6H_{12}O_6$) dissolving in water (H_2O).

Name the solute (solid) _____

Name the solvent (liquid) _____

Name the solution _____

Observe the solution. How can we tell that the sugar has not disappeared?

_____

How many substances were produced when sugar dissolved in water? _____

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Demonstration of potassium permanganate ($KMnO_4$) dissolving in water (H_20).

Name the solute (solid) _____

Name the solvent (liquid) _____

Name the solution _____

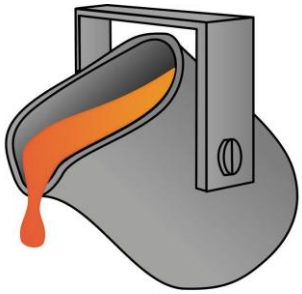
Observe the solution. How can we tell that the potassium permanganate has not disappeared?

_____

How many substances were produced when sugar dissolved in water? _____

Demonstration of melting sugar.

Gold is melted so that it can be poured into ingots. These are easier to transport and their value is easier to estimate



How many substances were heated? _____

How many substances were there when it cooled? _____

When sugar dissolved in water, was this a physical change or a chemical change? Explain your answer.

_____

_____

When sugar was melted, was this a physical change or a chemical change? Explain your answer.

_____

_____

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Fill in the missing words

Melting is a _____ change as the solid substance changes

from being a _____ to a _____ involving an

increase in _____.

_____ substance/s is/are involved

Dissolving is a _____ change as the solid substance

_____

_____.

_____ substance/s is/are involved

Crystals

Crystals are inorganic minerals with a constant geometric form and chemical composition. They form when materials are melted within the Earth due to great heat and pressure at depth. Common crystals are quartz, feldspar, diamond and pyrites (Fool's gold).

When we want to make chemicals from crystals in schools, we often dissolve them in water before heating them. Convection currents in the solution moves heat to the mineral molecules and allows them to heat without burning (oxidising in the atmosphere) in much the same way as we use water to cook potatoes and oil to cook chips without burning. Removing heat allows the molecules to rearrange themselves into a different crystalline pattern.