

Growing crystals: solubility and entropy



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Growing Crystals

Chemistry is a key element in science. Man needs science to survive.

Science gives us medicines and technology that help with our everyday life.

Science is the understanding of nature. Chemistry is a base for science.

Chemistry is a tool we use for understanding more and more things.

Chemistry is the study of matter. Matter is in everything and forms space.

Matter makes molecules and atoms. It forms all living things on earth, and the whole universe. The number one rule when understanding matter is that it occupies space. God created the earth and made matter, but He made matter have entropy. Entropy is the chaos and unbalance in the world. So if there is entropy, there is change.

Entropy can cause chemical reactions. A chemical reaction is a change that takes place when more than one chemical have a reaction and undergo some sort of change. For example, when you mix vinegar and baking soda, it turns into tiny bubbles and expands. This chemical reaction happens when the molecules from the vinegar combine with the baking soda. The two different types of molecules reform into one and release carbon dioxide atoms into the air, which causes the bubbles. There are all different kinds of chemical reactions in the world today though. Crystallization is one of these kinds of reactions.

Crystals are formed when the same molecules attach to each other repeatedly in a certainty order. Although, in order for this process to work, the molecules must repeat in the same order, or else it will not be successful. This order is what gives a crystal its unique shape and size.

Crystals have a huge history. We use crystals today to help with many things. Some crystals have healing properties, and others just look pretty. In ancient times, the Romans and the Egyptians used crystals for accessories, and fates. Different crystals for the two cultures could mean different things, like good luck and bad health. All crystals grow in different patterns all over the world.

Solubility is a key factor in growing crystals. Solubility is the ability of a solid to be able to dissolve in liquids. For example, Alka-Seltzer has a fast solubility rate. Although the solubility rate is fast, there are factors affecting the solubility rate in all solids, (these rules do not apply with gasses).

Temperature is one of the biggest factors with solubility. For instance, when dissolving Alka-Seltzer, it takes almost twice as long in colder water. You will find that most solubility rates are much faster when the object is in warm water instead of cold. Solubility is a key factor in crystallization. Pressure is another factor in solubility. Pressure can change according to the temperature, or altitude. For example, when you are in the mountains and you try and boil water, it will take you about five minutes instead of three. This is because the heat the flame is giving off is not being forced in the water, due to the low pressure.

When dealing with solubility, another factor comes into play. It is the nature of the object, which can be difficult to deal with. You must have a good understanding of the material before you try and just dissolve it. For example, if you took one gram of sugar and one gram of salt, then poured them into two separate glasses, you will see a slight difference in the rate of solubility. Although, when you try this same experiment with one gram of

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flour and one gram of salt, it could be totally different. When testing the nature of the object, it also depends on the surface area; surface area is the amount an object that is showing openly. Applying our surface area rule, when you do the experiment again and add ten grams of sugar and one gram of salt, the sugar will take much longer to dissolve. The reactions are at different times because there are more molecules to deal with.

There are many different mixtures in the world. Two of them are called solutions and colloids. A solution is when you have a mixture that is completely mixed, when there are no partials or chunks in the liquid. A colloid is the opposite; there are tiny chunks or partials suspended in the liquid. For example, when you go get a fruit smoothie, you may notice that there are seeds suspended in your drink, which would be a colloid. A solution could be soda, even though there is a plethora amount of sugar, it is all completely mix so you can not see any of it. You can make a solution out of a colloid. Sometimes if change the variables in solubility there may be a difference. Crystals are formed by colloid mixtures. Over time the molecules stick onto the partials and start there routine. Then they start to look like crystals over time. When conducting this experiment, all of these topics and factors come into play. Forming or growing crystals can take some time, but if done rite, they can come out beautiful. Although you can grow crystals, you can not grow them out of nothing. You need specific materials that God put before you. This project can show how amazing God is, in the fact that He created molecules, atoms, and all matter. God made everything, so when you conduct this experiment remember to do it, and then thank God for placing these things before you.