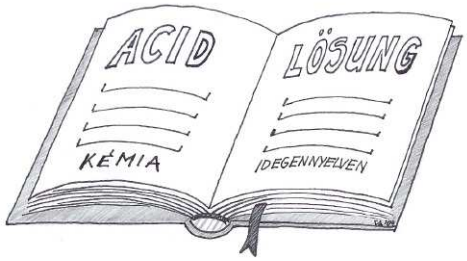
KÉMIA IDEGEN NYELVEN



Kémia angolul
Szerkesztő: MacLean Ildikó

Kedves Diákok!

Nagyon izgatottan várom már, hogy megérkezzenek az első fordítások (lapzártakor Ti még, gondolom buzgón fordítotok). Az elért eredményeiteket a későbbiekben feltétlenül figyelembe szeretném venni a megfelelő szöveg kiválasztásakor.
Hamarosan aktuális lesz a következő szöveg témája: a hópelyhek kémiája. A szöveg elején könnyen támaszkodhattok meglévő kémiai és fizikai ismereteitekre, de úgy érzem némi újdonságot is sikerült becsempészni a szövegbe.

A fordítást a következő címre küldjétek:

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Íme, az izgalmas szöveg, amelyhez jó munkát és egyben Áldott, békés Karácsonyt kívánok mindnyájatoknak!

Snowflake Chemistry

Snowflakes are a particular form of water ice. Snowflakes form in clouds, which consist of water vapor. When the temperature is 0° C or colder, water changes from its liquid form into ice. Several factors affect snowflake formation. Temperature, air currents, and humidity all influence shape and size. Dirt and dust particles can get mixed up in the water and affect crystal weight and durability. The dirt particles make the snowflake heavier, and can cause cracks and breaks in the crystal and make it easier to melt. Snowflake formation is a dynamic process. A snowflake may encounter many different environmental conditions, sometimes melting it, sometimes causing growth, always changing its structure.

What are common snowflake shapes?

Generally, six-sided hexagonal crystals are shaped in high clouds; needles or flat six-sided crystals are shaped in middle height clouds; and a wide variety of six-sided shapes are formed in low clouds. Colder temperatures produce snowflakes with sharper tips on the sides of the crystals and may lead to branching of the snowflake arms (dendrites). Snowflakes that grow under warmer conditions grow more slowly, resulting in smoother, less intricate shapes.

Why are snowflakes symmetrical (same on all sides)?

First, not all snowflakes are the same on all sides. Uneven temperatures, presence of dirt, and other factors may cause a snowflake to be lop-sided. Yet it is true that many snowflakes are symmetrical and intricate. This is because a snowflake's shape reflects the internal order of the water molecules. Water molecules in the solid state, such as in ice and snow, form weak bonds (called hydrogen bonds) with one another. These ordered arrangements result in the symmetrical, hexagonal shape of the snowflake. During crystallization, the water molecules align themselves to maximize attractive forces and minimize repulsive forces. Consequently,

water molecules arrange themselves in predetermined spaces and in a specific arrangement. Water molecules simply arrange themselves to fit the spaces and maintain symmetry.

Is it true that no two snowflakes are identical?

Yes and no. No two snowflakes are *exactly* identical, down to the precise number of water molecules, spin of electrons, isotope abundance of hydrogen and oxygen, etc. On the other hand, it is possible for two snowflakes to look exactly alike and any given snowflake probably has had a good match at some point in history. Since so many factors affect the structure of a snowflake and since a snowflake's structure is constantly changing in response to environmental conditions, it is improbable that anyone would see two identical snowflakes.

If water and ice are clear, then why does snow look white?

The short answer is that snowflakes have so many light-reflecting surfaces they scatter the light into all of its colors, so snow appears white. The longer answer has to do with the way the human eye perceives color. Even though the light source might not be truly 'white' light (e.g., sunlight, fluorescent, and incandescent all have a particular color), the human brain compensates for a light source. Thus, even though sunlight is yellow and scattered light from snow is yellow, the brain sees snow as white because the whole picture received by the brain has a yellow tint that is automatically subtracted.

Melting Snow and Ice with Salt

If you live in an area with a cold and icy winter, you have probably experienced salt on sidewalks and roads, used to melt the ice and snow and keep it from refreezing. Salt is also used to make homemade ice cream. In both cases, the salt works by lowering the melting or freezing point of water. The effect is termed 'freezing point depression'.

More Particles Mean More Melting Power

Sodium chloride isn't the only salt used for de-icing, nor is it necessarily the best choice. Sodium chloride dissolves into two types of particles: one sodium ion and one chloride ion per sodium chloride 'molecule'. A compound that yields more ions into a water solution would lower the freezing point of water more than salt. For example, calcium chloride ($CaCl_2$) dissolves into three ions (one of calcium and two of chloride) and lowers the freezing point of water more than sodium chloride. Here are some other de-icing compounds:

Chemicals Used to Melt Ice

Name	Formula	Lowest Practical Temp	Pros	Cons
Ammonium sulfate	$(NH_4)_2SO_4$	-7°C	Fertilizer	Damages concrete
Calcium chloride	$CaCl_2$	-29°C	Melts ice faster than sodium chloride	Attracts moisture, surfaces slippery below -18°C (0°F)
Calcium magnesium acetate (CMA)	Calcium carbonate $CaCO_3$, magnesium carbonate $MgCO_3$, and acetic acid CH_3COOH	-9°C	Safest for concrete & vegetation	Works better to prevent re-icing than as ice remover
Magnesium chloride	$MgCl_2$	-15°C	Melts ice faster than sodium chloride	Attracts moisture
Potassium acetate	CH_3COOK	-9°C	Biodegradable	Corrosive
Potassium	KCl	-7°C	Fertilizer	Damages

chloride				concrete
Sodium chloride (rock salt, halite)	NaCl	-9°C	Keeps sidewalks dry	Corrosive, damages concrete & vegetation
Urea	NH_2CONH_2	-7°C	Fertilizer	Agricultural grade is corrosive

http://chemistry.about.com/od/moleculescompounds/a/snowflake.htm
http://chemistry.about.com/cs/howthingswork/a/aa120703a.htm