

# Nucleation in structured water

## Introduction

Nucleation is a process where the molecules in a liquid start to gather into tiny clusters, arranging in a way that will define **the crystal structure of the solid (eg. ice) or liquid (eg. crystal structure in liquid water)**.

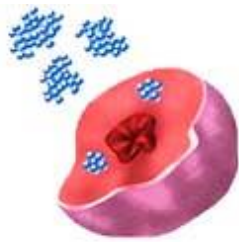
The classic example of nucleation in water is the change of destructured water (eg. urban supply and bottle drinking water) from a 5-sided (pentagonal) crystalline structure into a 6-sided (hexagonal) structure.



The natural state of flowing water, in a pristine flowing (vortex) stream is a 6-sided crystalline structure. This natural water has a negative (-mV) charge. However, when water is still and not flowing or vortexing (ie. stored in a tank, reservoir, dam, or pond) the water converts to a 5-sided crystalline structure (unnatural state). The water in cells (gel form) is structured water with a negative (-mV) charge.

Ever since the 1950's, scientists have been trying to convert still water into a permanent 6-sided crystalline structure. Phi'on achieved this *holy grail of water* in 2012 with a magnetic device by redesigning the magnetic array that was different from conventional approaches.

It is highly desirable for human health to drink natural, 6-sided crystalline, structured water with a negative charge as it is the natural state of water most optimal for cell function. When humans and animals consume unnatural, dead, 5-sided crystalline, destructured water with a positive charge, then the body has to expend energy to convert the positive charge to a negative charge. Structured water is syntropy (life affirming) water, while **destructured water is entropy (decaying) water and reduced cell function.**

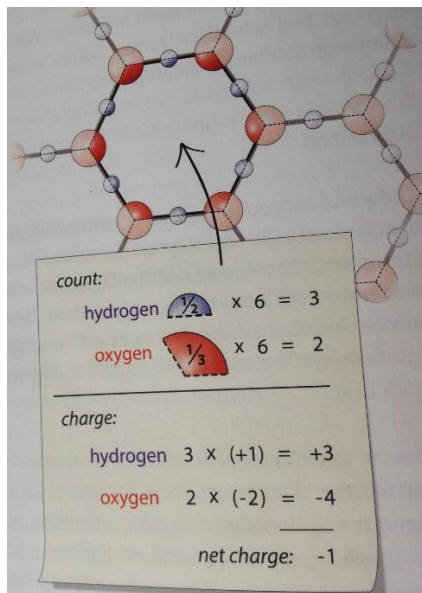


Large water clusters do not hydrate cells easily.



Small water clusters can easily penetrate cells for improved hydration.

When water is structured the molecules of the water are transformed through nucleation into smaller clusters (say 5-6 in a cluster) while destructured has large water molecule clusters (say 18-20).



The gel water in a cell has a negative charge because of the hexagonal, crystalline structure that carries a high density of electronegative oxygen (-) charge compared with the hydrogen (+) charge. See diagram to the left. Centre image is of hexagonal snowflake crystals.

## Background

Through billions of years of the energy and mass evolution, universal nature has been able to **create** highly sophisticated and ordered structures or geometry in living systems, including cells, cellular components, and viruses. The formation of these structures involves **nucleation and self-assembly**. **Radioactive and biological transmutation** are fundamental physical processes associated with the formation of any ordered structure in minerals, compounds, and cell processes. Perhaps this is the consciousness of the universe that provides the geometry (form), order and function for water, minerals, and life.

**Nucleation** is the first step in the formation of either a new thermodynamic phase or a new structure via self-assembly or self-organisation. Nucleation is typically defined to be the process that determines how long an observer has to wait before the new phase or self-organized structure appears. For example, if a volume of water is cooled (at atmospheric pressure) below 0 °C, it will tend to freeze into ice, but volumes of water cooled only a few degrees below 0 °C often stay completely free of ice for long periods. At these conditions, nucleation of ice is either

slow or does not occur at all. However, at lower temperatures ice crystals appear after little or no delay. At these conditions ice nucleation is fast. Nucleation is commonly how first-order phase transitions start, and then it is the start of the process of forming a new thermodynamic phase. In contrast, new phases at continuous phase transitions start to form immediately.

Nucleation is often found to be sensitive to impurities in the system. These impurities may be too small to be seen by the naked eye, but still can control the rate of nucleation. Therefore, it is often important to distinguish between heterogeneous nucleation and homogeneous nucleation. Heterogeneous nucleation occurs at *nucleation sites* on surfaces in the system. Homogeneous nucleation occurs away from a surface.

- **Heterogeneous nucleation**, which occurs when ice begins to form around a nucleation site, such as a physical disturbance, an impurity (such as salt) in the liquid or an irregularity in a container. Since biological samples are never pure water (unnatural or demineralised) they always experience heterogeneous nucleation.
- **Homogenous nucleation**, which occurs when ice forms without any predefined nucleation site. Pure (eg. demineralised) water will freeze at approximately  $-39^{\circ}\text{C}$  in the absence of nucleation sites. In practice, though, homogenous nucleation is not often seen because of the rarity of completely pure, unnatural water.

For example, when sugar is supersaturated in **water**, **nucleation** will occur, allowing sugar molecules to stick together and form large crystal **structures**. **Nucleation** is the first step in the formation of either a new thermodynamic phase or a new structure via self-assembly or self-organisation.

Also, the formation of hard lime scale on pipe walls by the  $\text{CaCO}_3$  content of water is a consequence of the **lack or scarcity of nucleation centers in ordinary (destructured) water**. When the concentration of the  $\text{CaCO}_3$  exceeds the solubility, the solidification can begin only at appropriate starting points most of the time at foreign matter. If no foreign matter is present in the form of particles in the liquid, solidification can start only at the walls of the pipe. Ordinary (destructured) water tends to surround any foreign particulate with complexes of 100 to 200 water molecules each. The water molecules agglomerate around every foreign particle in ordinary water. They form cages around them which makes them ineffective as nuclei. Then, the container walls are the only non-water substances available. The resulting crystals are of the dendritic mode. They are characterised by few starting points attached firmly to the wall and extended systems of crystals clinging to one another and to the wall around the starting point. The dendritic crystallisation mode is the initiation of the formation of hard lime scale which, if further solidification of the mineral occurs, grows layer over layer on the first set of dendrites.

When water is passed through a Phi'on MEA (Magnetised, Energised and Activated) water device, the crystalline structure of **the Calcite that forms the scale on pipe is transformed to**

**Aragonite (another form of  $\text{CaCO}_3$ ).** The Aragonite has a crystalline structure that does not stick to the pipe and therefore the Aragonite moves in the water and eventually settles on top of the water in a tank or other container.



In effect, the structured water from an MEA water device changes the water from an entropy form (destructured or *decaying*) into a syntropy form (*life affirming*). Consequently, the water changes its energy to a heightened form of consciousness (awareness). **MEA, structured water permanently retains its negative (-mV) charge**, while other commercial units hold a magnetic energy in the water for 60 hours at best and 2 hours at worst.

## Energy and entropy of water

Skeptics might doubt this process to be possible because the former liquid, destructured water and solid calcium carbonate is being turned into liquid, structured water that transforms the calcium carbonate from entropy to a syntropy form, within syntropy water. This means an increase in the energy of the water system. The question is: does the energy for this transformation comes from the magnets in the MEA water device or the flowing water? Clearly, the magnets entrain a negative (-mV) charge to the water and along with the kinetic energy of the flowing water, enable an immediate transformation of the water chemistry and crystal structure. Also, once this syntropy water enters a larger water body (eg. a pond or dam) the syntropy effect is entrained to the larger water body over time.

Eventually, pipes with scale are depleted of calcium carbonate ( $\text{CaCO}_3$ ). The constant presence of the structured water in the pipe enables the syntropy water energy to move in both directions within the pipe down a bore or any other water source. Also, because the water is in an active, structured form (ie. **reduced viscosity and increased surface tension**) the water is then **highly suitable for any spray applications**. The magnetically treated, structured water enables a transformation/transmutation process that may take several days or even weeks to dislodge all of the Calcite, however once it is achieved the structured water will prevent any Calcite adhering to the walls of pipes.

In effect, it is the consciousness or memory state of structured water (along with the permanency of the negative (-mV) charge) that sustains the syntropy energy of the water. That is, the water does not exhibit any entropy (decaying) properties.

# What is pure water?

Pure water is a term that have been invented to provide a class of drinking water that is marketed as fit for consumption. This type of *human induced water* is also known as purified water, or **water from a process that has removed all impurities**. Distilled water is often considered the most common form of pure water. Pure water processes can include carbon filtration, reverse osmosis, micro-porous filtration, and ultraviolet oxidation.

The water drinking industry and water governance regulators are full of marketing and science myths to convince people that all water has to be processed in a specific manner to make it *clean and drinkable*, before human consumption. However, these myths are created from a narrow view of the science of water. That is, the science is based on water chemistry (eg. water pH, and presence of certain materials that are considered toxic) when the critical property of drinking water is its physical crystalline structure. That is a natural 6-sided crystalline structure that defines the natural state of water in a pristine flowing stream and carries a negative(-mV) charge.

## History of revitalising water to its natural state

The vitalising and healing properties of magnetised water are intimately linked with the capacity of water to receive, store, and transmit information (ie. water memory) Natural water from a mountain stream is full of vitality especially if it has flowed over mineralised rock which is highly paramagnetic (ie. volcanic). However, when water passes through chemically contaminated soil, kilometers of steel metal or plastic pipe, and water treatment plants where it is exposed to toxic chemicals, like fluoridation and chlorination, the water loses its *vitality or life-force energy*. That is, the water converts from its vital 6-sided crystalline structure with a negative charge to a 5-sided, crystal structure with a positive charge. When this water exits the tap or shower head in a home it is lifeless. Consequently, city and town water will be harmful, not only because of its content of toxins, but also because it has developed a positive polarity which is harmful to organ and system cells in humans and animals. That is, the degradation of urban water can bring its vitality lower than the optimal vitality of cells (ie. -50mV), resulting in a loss of energy and more frequent health conditions (ie. loss of cell resilience).

Fortunately, the MEA water technology has a unique way to restructure water to its original natural and healthy state by entrainment, ie. *magnetising* the water with a permanent negative charge. That is, structured water has a specific water molecule cluster and *memory* (or consciousness) that can receive, store, and transmit an imprint of the magnetic energy (resonance or frequency) that the water has been exposed to, either simply from the earth's magnetic field, microbial activity in the water, and through flowing over paramagnetic rock. It is the fact that this *life-force or vitality memory* is devastated on its unnatural pathway to a drinking water source for humans and animals.

However, when the water is re-magnetised or structured by passing it through a MEA water device, installed inline to pipes, the water vitality is restored. Also, magnetised water is softer than ordinary (lifeless) tap water so magnetisation can result in significant savings in the use of detergents and soap use for bathing. Restructured water also helps prevent deposits on cutlery and glasses washed in a dish washer and make hair shinier and more manageable.

Johann Grander and Heinrich Antosch, both disciples of the *father of water magnetisation*, Dr. Viktor Schauberger, developed some of the first water conditioning units to produce *living water*. These units used vigorous vortex mixing in a special chamber to eliminate the water's memory of pollutants, chlorine, etc. and then imprint a beneficial magnetic memory on the water before it exits the tap. The units were installed under the sink or on the main water line and always located after any other filters and treatment devices. However, the water restructuring from these devices was temporary (often 2-30 hours).

However, the **MEA water conditioners** are a more simple and robust design that uses only a unique magnetic resonance energy array to produce a permanent negative charge (6-sided crystalline structure) in the water. The full range of MEA water devices is at [www.meawater.com](http://www.meawater.com).

## Magnetism and cell health

Human beings have no doubt adapted to a certain strength of the earth's magnetic field. At the moment this strength is declining at a rate which may exceed our capacity to cope. Add to that the fact that we, to an increasing degree, encase ourselves in steel or reinforced concrete buildings, cars, subways, and many other *cages* which essentially screen out the already weakened magnetic field and the stage could well be set for a massive dose of magnetic deficiency syndrome.

Research carried out by NASA has demonstrated that astronauts who are cut off from the earth's magnetic field develop significant health problems which can be prevented by providing an artificial magnetic field within the space capsule.

## Magnets and health

The consumption of magnetised water with a permanent negative charge is the emerging as one of the most exciting development in the ongoing battle to protect the health of humans and animals.

The human body is profoundly responsive to electromagnetic fields. MRI (magnetic resonance imaging) is a powerful medical diagnostic technique which uses magnetic fields to distinguish between healthy and diseased tissues. Treatment with pulsed electromagnets (pulsars) has been found highly effective in curing or alleviating conditions such as bone fractures, migraine headaches, insomnia, and depression. Pads and mattresses with built-in magnets are used to alleviate insomnia, rheumatic pain, migraines, and circulatory problems. Says Dr. Wolfgang Ludwig ScD PhD of the Institute for Biophysics in Horb, Germany *Magnetic field therapy is a*



*method that penetrates the whole human body and can treat every organ without chemical side effects.*

The effects of the North pole (negative) and South pole (positive) magnetism are quite different. North polarity stabilises, calms, and sedates and also reduces pain, infection, and inflammation. South polarity, on the other hand, is acid producing, enervating, biologically disorganizing and may accelerate bacteria growth. Magnets with a South polarity should only be used under the care of a trained practitioner, if at all.

The fact that our bodies consist mainly of water and that all our bodily processes are heavily dependent on water has led to research into the possibility of using magnetised water to promote health and treat disease.

## Benefits of magnetised water in the environment

For those of us who associate magnetism with intricate patterns of iron filings between the poles of a magnet the idea that water can be magnetised sounds pretty far out. However, there is ample evidence that magnetising water either with permanent magnets or with electromagnets actually has a profound effect. The first practical application of water magnetization occurred in the 1950's when engineers discovered that magnetically treated water had a greatly reduced tendency to form scale when heated. Several explanations for this have been advanced. The most plausible being that magnetisation breaks up the clusters water which surround lime and other *foreign* molecules. By doing so these molecules get the opportunity to crystallise and be carried along in the water rather than deposit themselves on the walls of the pipes. Although this explanation has many proponents it does not fully explain why magnetised water also dissolves old scale deposits. Another explanation is that magnetised (structured) water transforms Calcite in Aragonite, and in this form of calcium carbonate, it does not adhere to pipe walls.

Magnetised water has also been found useful in the treatment of swimming pool water. Researchers at the University of Cranfield in the UK recently discovered that they could reduce the amount of chlorine needed to kill bacteria in a pool by 30 percent by clamping magnets on the water supply line. Dr. Klaus Kronenberg, a professor at the California State Polytechnic University, has found that the use of magnetised swimming pool water essentially eliminates the deposits formed where the top surface of the water meets the sides of the pool.

Researchers at the Medical University of South Carolina recently reported that cleaning the teeth with water from a magnetised irrigator can reduce calculus formation by over 60 per cent and improve overall gum health.

Israeli agricultural researchers found that the use of magnetised water increased farm yields by anywhere from 5 to 20 per cent. Cows drinking magnetised water produced more milk and were healthier than cows drinking untreated water. Sheep produced more wool and meat, hens laid more eggs and all farm animals survived longer when drinking magnetised water.

Anecdotal evidence of the health benefits of magnetized water abounds. Magnetised water is claimed to be energy-building, activating, cleansing, and detoxifying. There are reports of people resolving bladder problems, recovering quickly from a stroke, alleviating arthritis pain, and reducing blood pressure by drinking magnetised water. It is perhaps reasonable to assume that if scientific studies on animals have proven that magnetised water has health benefits, then it should also be beneficial to humans. However, so far there have been no systematic, clinical trials done to prove or disprove the healing effects of magnetised water in humans.

A very recent development in magnetic water treatment involves the use of paramagnetic soil. Paramagnetic soil comes from volcanic rock which was permanently imprinted with the earth's magnetic field just before it solidified. Paramagnetic rock and soil are not ferromagnetic (does not attract iron filings) but their magnetic dipoles are aligned in such a way that the soil or rock is strongly attracted to a regular magnet. Due to the age of the rock the *magnetic field* imbedded in it is often quite strong, considerably stronger than the earth's magnetic field today. It is interesting that many holy sites and healing spas were built near paramagnetic rock formations. Perhaps our ancestors were able to directly feel the benefits of paramagnetism.

The use of water treated by contact with paramagnetic soil is still in its infancy. However, agricultural experiments have clearly shown that both the paramagnetic soil itself (used as a fertiliser) and irrigation with paramagnetically treated water increase yields and plant vigour significantly.

Anecdotal evidence of health benefits are emerging, and inexpensive devices like the MEA water device ([www.meawater.com](http://www.meawater.com)). A concerted effort is also being undertaken to develop reliable methods of actually measuring the effects of treating water either with magnets or paramagnetic soil. There is some indication that the UV (ultraviolet) spectrum of water is changed by magnetisation and Dr. Thomas Narvaez, a researcher in Washington State, has successfully used radionics to measure the vitality of treated water. A clinical trial is in the planning stage to evaluate the benefits of magnetised water in the treatment of chronic fatigue syndrome.