

New observations on properties of water

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Experimental studies conducted by Ph.D. Anatoli Bogdan at the University of Helsinki, Finland, have received broad interest in the scientific world, as the results might have applications even in the cryopreservation of cells and tissues.

Bogdan's results show that mixture droplets consisting of sulphuric acid and water can be slowly cooled down to -140 degrees Celsius and then heated again without ice formation. The formation of ice is particularly problematic in cryopreservation, as the crystal formation damages cell structures.

Bogdan has conducted his experiments by cooling and heating droplets of 0.5-6 μm in diameter. His study focuses on two forms of water: low-density amorphous ice (LDA, or so-called glassy water) and highly viscous water (HVW), which is a liquid phase that LDA melts into. Bogdan reports that HVW is not a new form of water as some scientists believed. Bogdan's study Reversible Formation of Glassy Water in Slowly cooling Diluted Drops has been published in *Journal of Physical Chemistry* in June 2006.

Bogdan himself applies his observations on the properties of water in cloud research, and he and his colleagues have recently published a study dealing with cirrus clouds (Formation of Low-Temperature Cirrus from $\text{H}_2\text{SO}_4/\text{H}_2\text{O}$ Aerosol Droplets, *Journal of Physical Chemistry*, November 2006). Their study suggests that, unlike previously thought, the cloud crystals in cirrus clouds are not completely solid ice, but are covered with a layer of liquid water and sulphuric acid. The layer effects for

instance the reflectivity of the clouds, and therefore the climate. It has also been observed that the rate of ozone loss is higher on liquid than on solid surfaces. The results therefore indicate that the ozone is destroyed in the cirrus clouds faster than conventionally has been thought.

Source: University of Helsinki

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