

Possible Further Indications Of The “Autothixotropic” Phenomenon Of Water

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The purpose of our previous work [1] was to determine the influence of mechanical and electrical treatment on the electrical conductivity of aqueous solutions. Solutions were treated mechanically by iteration of two steps: 1:100 dilution and vigorous shaking. These two processes were repeated until extremely dilute solutions were obtained. For electrical treatment the solutions were exposed to strong electrical impulses. Effects of mechanical (as well as electrical) treatment could not be demonstrated using electrical conductivity measurements. However, significantly higher conductivity than those of the freshly prepared chemically analogous solutions was found in all aged solutions except for those samples stored frozen. The results surprisingly resemble a previously noticed phenomenon in liquid water, which may develop when water is stored in closed vessels. The phenomenon was termed “autothixotropy of water” due to the weak gel-like behavior which may develop spontaneously over time where ions seem to play an important role. We suggested that also contact with hydrophilic surfaces could be the determinative condition for the occurrence of the phenomenon.

To verify the phenomenon we further explored the literature. Generally, water is thought as a homogenous liquid at ambient temperatures. However, experiments with emphasis on static and dynamic laser light scattering (LLS), indicating the existence of large-scale, long-lived inhomogeneities in aqueous solutions, which seem to be a rather universal phenomenon occurring in a vast number of systems, are accumulating. Furthermore, it was pointed out in several publications that both, natural and distilled water can produce luminescence. It was found that emission spectra of water depend (also) on the storage of water in closed vessels [2]. Auto-oscillations of water luminescence were observed and attributed to the concentration of dissolved oxygen [3]. According to this, water could be considered as an active excitable medium. It may even establish the appropriate conditions for self-organization of systems.

Self-organization of water molecules could indeed lead to the development of the "autothixotropic" phenomenon which may be noticed, for instance, as long-lived inhomogeneities by LLS, higher conductivity values and long-term changes in spectral parameters of water. The main factors inducing the phenomenon could be ions, hydrophilic surfaces and dissolved oxygen. Therefore, in our opinion, further research on this topic should be stimulated.

1. Verdel N., et al. *Int. J. Mol. Sci.* 2012, 13: 4048-4068.
2. Lobyshev V.I., et al. *J. Mol. Liq.* 1999, 82: 73–81.
3. Gudkov S.V., et al. *J. Phys. Chem. B* 2011, 115: 7693-7698.