

Different Kinds Of Water: Quantum Processes May Be Ubiquitous In The Natural World

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Several interesting experiments involving liquid water with unexpected results have been produced in the past years:

1. water near to hydrophilic surfaces shows interesting properties differing significantly from those of ordinary bulk water;
2. extraction of electricity from an aqueous electrolytic solution by twin Platinum electrodes, mediated by oxygen molecules;
3. evidence of stable aggregates of water at room temperature and pressure after iterative contact with polymer membranes or after iterative filtration;
4. formation of floating water bridge under intense electric fields;
5. variation of the aggregation of non-polar macromolecules and change of the enzyme kinetic in water solutions under the influence of weak magnetic fields.

The puzzle emerging from these and others experimental observations can merge in a satisfactory picture whenever we look at the water structure and its importance in life using quantum mechanic. Discoveries in recent years suggest quantum processes may well be ubiquitous in the natural world, they can provide a dynamical base to explain the origin of “vicinal water” that is the structured layer existing near the surface of an organic macro-molecule and extending over a zone larger than the one obtained only via classical short-range forces. Also the spontaneous folding of biomolecules can be understood with a two-phase (more and less structured) model of liquid water. In the formation of macromolecules the surface available for the interaction with water decreases and water molecules are expelled, this means a decrease of the entropy of the macromolecule, which becomes more structured and a decrease of the thickness of the surface water layer with a major increase of the entropy of the whole system. Finally, the role of weak magnetic fields on livings can be figured out considering the de-structuring effect of magnetic fields on ordered water and its consequences on the acido-base equilibrium in solutions.