

**STRUCTURING OF WATER CLUSTERS UNDER THE SOLAR INFLUENCE AND  
THEIR COPYING BY BULK WATER. INFLUENCE OF THE SUN ON THE NIGHT SIDE  
OF THE EARTH**

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Even 0.02% water in acetonitrile can form clusters, the size and chemical reactivity of which can change under the influence of the Sun. Bulk water added to such acetonitrile can copy and reproduce these original clusters and acquire different hydrolytic activities depending on the size of the copied clusters. As a result, the rate of hydrolytic reactions with the added water can vary greatly depending on where the acetonitrile was located before the reaction – outdoors, inside buildings or underground. [1]

The influence of the Sun is accounted for by the decomposition of water clusters by muons, which are generated in the upper atmosphere by the solar wind. Due to the anisotropy of the muon flux the rate of hydrolysis depends on the geometry of the reaction solution, its position in space and constantly changes during the day depending on the position of the Sun in the sky. [2]

For example, at noon, when the Sun is at its zenith, the rates of this reaction in three 5-mm NMR-tubes directed North-South, East-West and Vertically are considerably higher in the horizontal tubes, and at sunrise and sunset when the Sun shines along the East-West line the rate is higher in the vertical tube.

It was logical to assume that at night when the Sun irradiates the opposite side of the Earth, this phenomenon should disappear, and the reaction rates should be the same in all differently directed tubes. However, experiments carried out at midnight did not confirm this and gave the same results as at noon. In the vertical tube, the rate is significantly less than in the horizontal tubes. The same distribution of triethyl phosphite hydrolysis rates in multidirectional tubes day and night allows us to conclude that on the night side of the Earth the influence of the Sun is inducing the appearance of some radiation vertically from underground. The mechanism of the solar influence at night requires a detailed comprehensive study. Measuring the rate of hydrolysis of triethyl phosphite in acetonitrile in multidirectional 5mm NMR-tubes at different locations on Earth at different latitudes may help to explain this fundamental phenomenon, which is important for biological, chemical, physical and environmental research.

## References:

- [1] I.V. Shevchenko, Structuring of water clusters under the solar influence and their copying by bulk water, *Journal of Molecular Liquids* 393 (2024) 123576.  
<https://doi.org/10.1016/j.molliq.2023.123576>
- [2] I.V. Shevchenko, Influence of the Sun on water. Dependence on geometry of solution and its position in space, *Journal of Molecular Liquids* 379 (2023) 121681.  
<https://doi.org/10.1016/j.molliq.2023.121681>
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