

## **Physico-Chemical nanomaterials science**

### **Nanoscale observation of dehydration process in hydrophilic polymeric structures**

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Positron Annihilation Lifetime Spectroscopy (PALS) is the powerful tool to observe structure changes in subnano scale. Studies provided by means of PALS method are found application in many fields concerning materials science and can be also utilize to investigation of hydrophilic polymers. One of the most important field of interest in respect to hydrogel materials is their capability to water storage. Such a problem is important regarding to diffusion of fluid media containing nanoparticles , what is very useful in ophthalmic materials, drug delivery systems or tissue engineering .

In presented work, dehydration process in hydrogels used in ophthalmology was observed. Before measurements studied materials were immersed in deionized water and saline solution to obtain equilibrium swelling state. Studies of the dehydration process were carried out by use of PALS, FTIR and gravimetric analysis. Obtained results indicate that the hydrogel structures affected by saline solution are more prone to absorb of water than one affected by deionized water. It is in compatibility with assumption that free volume sizes in hydrogels depends on the pH changes what can result in changes of nanoparticles diffusion in such a systems.