

Nanochemistry and biotechnology

Spectral properties solution of DNA in distilled water with the addition of hydrogen

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Deoxyribonucleic acid (DNA) - a well-known biological macromolecule that is necessary for the existence of all organisms. The main target of DNA is to preserve and transmission of genetic information. It is because of possible replication spiral reproduction of all life forms - from simple to complex multicellular organisms.

Thus, the study of electronic properties of DNA and interaction among its structural units is an important task of modern science. Such properties associated with the presence of pi-electron groups in the chain of DNA is shown in the optical wavelength range (near "biological" ultraviolet, visible and near infrared region spectrum). This fact gives grounds for the application of optical spectroscopy to study the electronic structure of DNA.

The study of electronic properties of DNA, other than purely scientific value, has many practical applications that can be extremely useful in biology, medicine and pharmacology.

It is well known, we can't observe the luminescence of DNA at room temperature. But, when we made solution DNA+H₂+distilled water, it causes this process possible, because excess of Hydrogen connected with Oxygen in DNA. Moreover, peak position and the shape of the spectrums fluorescence in 300K and in 77K are very similar.

This line of research is appropriate because of the environment of DNA existence in the human body. The half of the atoms in our organism is exactly Hydrogen. It creates hydrogen bonds and regulates acidity. Due to small molar mass of H₂ it has the high ability to penetrate through tissue.

We also investigate the phosphorescence and the nature of the glow.