

Influence of deuterium exchange on the processes of proton magnetic relaxation in polysaccharides

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Abstract

Method of relaxation spectroscopy of proton magnetic resonance (PMR) using the technique of deuterium exchange was applied to analyze free induction decay signals obtained from dried and wet polysaccharides. Free induction decay signals were approximated by the function of three exponents sum, each of them describing the magnetization decay in areas with different degree of orderliness. Cellulose and chitosan were used as samples. It was found that if the isotope exchange reaction is carried out with an excess of liquid D₂O, protons are involved to reaction not only from amorphous areas, but also from some parts of the ordered areas. It is shown that the influence of the plasticizing action of sorbate molecules increases the mobility of each component of the whole system, accompanied by changes of the proton density in the areas with different orderliness.