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Changing the fine cellulose structure as a result of heterogeneous modification processes

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Abstract

NMR relaxation spectroscopy method was used to analyze the changes of the fine structure of cellulose in the alkali treatment with varying the reactant concentration and the exposure time. It is shown that the spin-lattice relaxation parameter is sensitive both to changes in the degree of crystallinity by mercerizing cellulose and to polymorphic transition of cellulose I to cellulose II. It is suggested that as a result of mercerization a more ordered mesophase is formed in the amorphous regions of cellulose. We demonstrated the relationship between the processes of the spin-spin relaxation of adsorbed water and the depth of the structural changes in the pulp as a result of its stepwise processing by dimethylsulfoxide and alkali solutions.