
Solvent – cellulose interactions and self-diffusion NMR of Tetrabutylphosphonium hydroxide

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Résumé

Nuclear magnetic resonance is a powerful tool used to characterize cellulose to determine a magnitude of various information. Cellulose is known to be hard to dissolve in common organic solvents due to its strong intra and intermolecular hydrogen bonds. Many newer and greener solvents as some ionic liquids, deep eutectic solvents, and of salt/organic compounds have been reported to have dissolved cellulose at various weight percentages (Fink, H.-P *et al.*, 2001 ; Frey, M. W *et al.* 1996; Frey, M. W *et al.* 2006 ; Ramos, L. A *et al.* 2005; Isogai, A. & Atalla, R. H. 1998). NMR and diffusion NMR are techniques used to investigate the prowess of a solvent to dissolve cellulose (Gentile, L., & Olsson, U. 2016; Abe, M., Fukaya, Y., & Ohno, H. 2012.). We report the self-diffusion of the solvent tetrabutylphosphonium hydroxide with two different MW microcrystalline cellulose MCC160 and MCC680 at various weight percentages and the interactions between solvent and cellulose . In diffusion NMR we can conclude that the diffusion coefficient decreases with the concentration of cellulose, and due to the fast exchange environment around the OH- functions in the aqueous medium we can observe the number of bounded TBP+ ions increase with the concentration of cellulose.

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