Silylation of cellulose using a cyclotetrasiloxane and their polymerization

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A B S T R A C T

Microfibrillated cellulose (MFC) is a natural material which can be extracted from plant cell wall. consists of attractive properties such as high strength, excellent stiffness, and high surface area, but its hydroxylated surface is often pointed out as a limiting factor for its use in commercial applications. MFC cannot be ideally dispersed in non-polar solvents, monomers or polymers since the hydrophilic surface of the MFC is incompatible with hydrophobic environments. The complete dissolution of cellulose in a solvent system, more or less complex. a cyclotetrasiloxane was synthesized via hydrosilylation of 1, 3, 5, 7-tetramethylcyclotetrasiloxane (D_4H) with Trimethoxyvinylsilane (TMVS). The structure of tetramethylcyclotetrasiloxane modified with Trimethoxyvinylsilane (D_4H– TMVS) was characterized by Fourier transform infrared (FT-IR), 1H nuclear magnetic resonance (^{1}H-NMR). This cyclotetrasiloxane was binding to cellulose then polymerizing it by ring-opening polymerizations (ROP)with an initiator in a second step. polysiloxane are useful for conferring chain flexibility, biointegrity, radiation resistance, thermal stability and hydrophobicity. With an appropriate degree of silylation, cellulose will disperse efficiently in organic solvents such as acetone, chloroform and tetrahydrofuran. As a result, the possibility of using cellulose is increased in a number of different disciplines, such as antioxidants, bio-composites, biomedical, carbon fiber , Photo-catalyst and photovoltaic, Adsorption of heavy metal ions ,and wood adhesives.

Keywords:

Cellulose; Hydrophobicity; Trimethoxyvinylsilane (TMVS); 1, 3, 5, 7-tetramethylcyclotetrasiloxane (D_4H); Hydrosilylation; cyclotetrasiloxane; ring-opening polymerizations (ROP).