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**Surface Modification of Cellulose Nanowhisker throughout Graft Polymerization  
of 2-ethyle -2-oxazoline**

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**A b s t r a c t**

The cellulose nanocrystals, prepared by acid hydrolysis of cotton linter, consisted of slender rods with an average length of 173 nm and diameter of 80 nm, respectively. The surface of obtained cellulose nanocrystals were chemically modified using tosyl chloride and then tosylated cellulose nanowhisker was used as macroinitiator for cationic ring opening graft polymerization of 2-ethyle 2-oxazolin monomer. The occurrence of chemical modification was evaluated by FTIR and <sup>1</sup>H NMR spectroscopies. Finally cellulose-g-POX was hydrolysed in acidic condition and therefore cellulose nanowhisker-g-PEI was prepared. X-ray diffraction measurements showed that the initial crystalline structure of CNW (Type I<sub>β</sub>) was changed during graft polymerization and grafted POX in the surface of CNW was in amorphous form and DLS measurements showed that the hydrodynamic dimensions of the resulted product is about 135 nm.

**Key Words:** cellulose nanowhisker, poly (2-ethyl-2-oxazoline), cellulose nanowhisker-graft-polyethylenimine, biopolymer, graft copolymerization.

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