## Accepted Manuscript

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

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PII: S0144-8617(13)00446-3

DOI: http://dx.doi.org/doi:10.1016/j.carbpol.2013.04.082

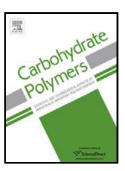
Reference: CARP 7700

To appear in:

Received date: 2-3-2013 Revised date: 10-4-2013 Accepted date: 27-4-2013

Please cite this article as: Tehrani, A. D., & Neysi, E., Surface Modification of Cellulose Nanowhisker throughout Graft Polymerization of 2-ethyle -2-oxazoline, *Carbohydrate Polymers* (2013), http://dx.doi.org/10.1016/j.carbpol.2013.04.082

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## ACCEPTED MANUSCRIPT

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2	Surface Modification of Cellulose Nanowhisker throughout Graft Polymerization
3	of 2-ethyle -2-oxazoline
4	
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8	
9	Abstract
10	The cellulose nanocrystals, prepared by acid hydrolysis of cotton linter, consisted of slender
11	rods with an average length of 173 nm and diameter of 80 nm, respectively. The surface of
12	obtained cellulose nanocrystals were chemically modified using tosyl chloride and then
13	tosylated cellulose nanowhisker was used as macroinitiator for cationic ring opening graft
14	polymerization of 2-ethyle 2-oxazolin monomer. The occurrence of chemical modification
15	was evaluated by FTIR and <sup>1</sup> H NMR spectroscopies. Finally cellulose-g-POX was
16	hydrolysed in acidic condition and therefore cellulose nanowhisker-g-PEI was prepared. X-
17	ray diffraction measurements showed that the initial crystalline structure of CNW (Type $I_{\beta}$ )
18	was changed during graft polymerization and grafted POX in the surface of CNW was in
19	amorphous form and DLS measurements showed that the hydrodynamic dimensions of the
20	resulted product is about 135 nm.
21	
22	Key Words: cellulose nanowhisker, poly (2-ethyl-2-oxazoline), cellulose nanowhisker-graft-
23	polyethylenimine, biopolymer, graft copolymerization.
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