Abstract

Functionalized cellulose nanofibers have been obtained through electrospinning and modification with oxolane-2,5-dione. The application of the nanofibers for adsorption of cadmium and lead ions from model wastewater samples is presented for the first time. Physical and chemical properties of the nanofibers were characterized. Surface chemistry during preparation and functionalization was monitored using Fourier transform-infrared spectroscopy, scanning electron microscopy, carbon-13 solid state nuclear magnetic resonance spectroscopy and Brunauer Emmett and Teller. Enhanced surface area of 13.68 $m^2 g^{-1}$ was recorded for the nanofibers as compared to the cellulose fibers with a surface area of 3.22 $m^2 g^{-1}$. Freundlich isotherm was found to describe the interactions better than Langmuir: K_f = 1.0 and 2.91 mmol g^{-1} (r^2 = 0.997 and 0.988) for lead and cadmium, respectively. Regenerability of the fiber mats was investigated and the results obtained indicate sustainability in adsorption efficacy of the material.