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Investigation of Carboxymethyl Cellulose Adsorption onto Regenerated Cellulose Surfaces via Quartz Crystal Microbalance with Dissipation Monitoring and Surface Plasmon Resonance Spectroscopy ZELIN LIU, Department of Chemistry (0212),Virginia Tech, Blacksburg, VA 24061, PAUL GATENHOLM, Department of Materials Science and Engineering (0237),Virginia Tech, Blacksburg, VA 24061, ALAN ESKER, Department of Chemistry (0212),Virginia Tech, Blacksburg, VA 24061 — The adsorption of anionic polyeletrolytes, sodium salts of carboxymethyl celluloses (CMC), with different degrees of substitution (DS = 0.9 and 1.2) from aqueous electrolyte solutions onto regenerated cellulose surface was studied via quartz microbalance with dissipation monitoring (QCM-D) and surface plasmon resonance (SPR). The influence of both calcium chloride ($CaCl_2$) and sodium chloride (NaCl) was examined. Both QCM-D and SPR results indicate that CMC adsorption onto regenerated cellulose surfaces increases with increasing electrolyte concentration and $CaCl_2$ (divalent cation) showed a significant effect on CMC adsorption compared to NaCl (monovalent cation) at the same ionic strength. Voigt-based viscoelastic modeling of the QCM-D data and analysis of the SPR data are consistent with the existence of a swollen CMC layer on the cellulose surface with a viscosity of $\sim 1.310^{-3}$ kg m^{-1} s^{-1} and an elastic shear modulus of $\sim 10^5$ kg m^{-1} s^{-2}.

Zelin Liu

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