Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Adsorption of Derivatized Dextran Polyelectrolytes onto Nanocrystalline Cellulose[1] ALAN ESKER, JOSHUA KITTLE, XIAOSONG DU, Virginia Tech, Department of Chemistry (0212), Blacksburg, VA 24061, FENG JIANG, MAREN ROMAN, Virginia Tech, Department of Wood Science and Forest Products (0323), Blacksburg, VA 24061, HOLGER WONDRACZEK, ANDREAS KOSCHELLA, THOMAS HEINZE, Center of Excellence for Polysaccharide Research, Friedrich Schiller University of Jena, Humboldtstrasse 10, Jena, 07743 Germany — The adsorption of a series of cationically derivatized dextran polyelectrolytes onto anionic nanocrystalline cellulose (ANC) has been studied using quartz crystal microbalance with dissipation monitoring (QCM-D) and surface plasmon resonance (SPR). Samples of dimethylaminoethyl-dextran (DMAE-Dex), diethylaminoethyl-dextran (DEAE-Dex), and diisopropylaminoethyl-dextran (DIAE-Dex) had degrees of substitution (DS) ranging from 0.06-0.90. DMAE-Dex, DEAE-Dex, and DIAE-Dex all showed decreasing adsorption onto ANC and decreasing water content of the adsorbed film with increasing DS. Additionally, DEAE-Dex films adsorbed onto ANC had lower water contents than DMAE-Dex films with the same DS. Interestingly, QCM-D results for DIAE-Dex with high DS revealed mass loss, while SPR results clearly showed DIAE-Dex adsorbed onto ANC. These observations were consistent with dehydration of the ANC substrate. This study indicates that by controlling the DS and hydrophobic content of the polyelectrolyte, the water content of the film can be tailored.

[1]National Science Foundation (CHE-0724126)

Alan Esker
Virginia Tech, Department of Chemistry (0212), Blacksburg, VA 24061

Date submitted: 11 Nov 2011 Electronic form version 1.4