

The Build-Up and properties of Microfibrillated Cellulose Based Free-Standing Films

Erdem Karabulut

The Royal Institute of Technology (KTH), Fibre and Polymer Technology
Teknikringen 58, SE 100 44, Stockholm, SWEDEN

Layer-by-layer (LbL) films of microfibrillated cellulose (MFC) with a cross-sectional diameter of 5-15 nm and length of 1-2 micron have been prepared by combining different types of polyelectrolytes such as polyethyleneimine (PEI) and polyvinylamine (PVAm). Consecutive adsorption of these components was investigated by quartz crystal microbalance with dissipation and in situ dual-polarization interferometry methods. Results showed that the adsorption kinetics was rather fast and also there was no a significant desorption after rinsing steps. Data obtained from two methods indicated a total solvent content of ca. 56% in the (MFC/PEI)₅ film. Perfluoroalkyl coated surfaces were prepared for allowing peel-off and preparation of free-standing LbL films of anionic MFC and PEI. Contact angle values of the reference and perfluoroalkyl surfaces indicated a change of surface behavior from being largely hydrophilic to hydrophobic. Height profiles and cross-sectional images of LbL films were monitored by AFM and FE-SEM.