

142az Molecularly Smooth Cellulose Surfaces for Adhesion Studies

Hans Riegler and Ronny Szezech

Thin and smooth cellulose films were prepared via spin coating from cellulose solution (dimethylacetamide, 7% lithium chloride) and analyzed by ellipsometry, AFM, FTIR, ICP-MS, x-ray reflectivity, and contact angle measurements. For very low cellulose concentrations the wafer surfaces are covered with a network of cellulose fibers (incomplete film). With higher concentrations, closed, smooth, films with thicknesses between 1 and 10 nm are obtained. Thicker films have rougher surfaces. Cellulose aggregates are adsorbed on top of a closed film. Studies with polyelectrolytes as adhesives demonstrate that the films are excellent model surfaces to investigate cellulose/cellulose adhesion. The adhesion depends on the degree and sequence of the adsorption of the polyelectrolytes on the cellulose surfaces. At low coverage, polyelectrolyte bridging between the surfaces enhances adhesion whereas high polyelectrolyte coverage decreases or even prevents adhesion.