# AFM investigation of Spin-coated Cellulose Films

A. L. Da Róz[1], F. L. Leite[1], A. J. F. Carvalho[2], V. Zucolotto[1] and O. N. Oliveira Jr[1]
[1] *Instituto de Física de São Carlos, Universidade de São Paulo, Brazil*
[2] *Universidade Federal de São Carlos, Sorocaba, Brazil*

We report on a method for preparing cellulose thin films submitted to oxidation processes, which may represent an important strategy for improving adhesion of polysaccharides [1]. Native and oxidative cellulose films were prepared with microcrystalline cellulose using spin-coating, a simple method to produce model surfaces of cellulose [2,3]. After spin-coating deposition of cellulose on gold-covered glass slides, the cellulose film was aged and treated with oxidizing agents. The effects from oxidation and ageing on morphology were studied with atomic force microscopy (AFM) and Fourier transform infrared (FTIR) and UV/Vis spectroscopies. The use of optimized spin-coating parameters, such as a substrate rotation at 2500 rpm, resulted in a 200 nm thick cellulose film with roughness of 11 nm. *In natura* cellulose films displayed a denser network structure, in comparison to thin films made with oxidized cellulose (figure 1).

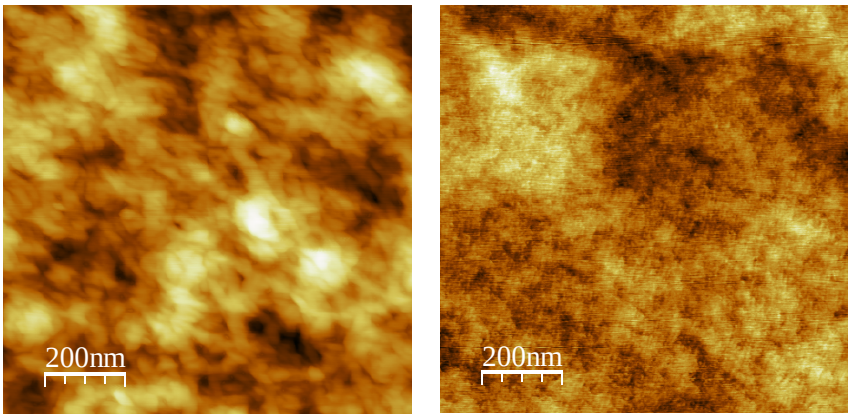


Figure 1. AFM images (1 x 1 μm) of cellulose thin film (a) and oxidized cellulose thin film (b).

Keywords: cellulose thin film, spin coating, Atomic force microscopy (AFM)

Work supported by CNPq, IFSC/USP.

[1] V. Kumar, T. Yang, Carbohydr. Polym. **48**, 403 (2002).
[2] S. Gunnars, L. Wågberg, M.A. Cohen Stuart, Cellulose **9**, 239 (2002).
[3] E. Kontturi, P.C. Thüne, J.W. Niemantsverdriet, Polymer **44**, 3621 (2003).

*alessandra.roz@gmail.com*
*Grupo de Polímeros "Prof. Bernhard Gross", Instituto de Física de São Carlos da Universidade de São Paulo, Av. do trabalhador São-Carlense, 400, PB 369, CEP 13560-970, São Carlos, São Paulo, Brasil.*