

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Structure and Swelling Behavior of Weak Polyelectrolyte Brushes

CHAITRA DEODHAR, ERICK SOTO-CANTU, University of Tennessee, DAVID UHRIG, JOHN ANKNER, S. MICHAEL KILBEY II, Oak Ridge National Laboratory — In this work we describe the structure and swelling behavior of polyelectrolyte brushes consisting of poly(methacrylic acid) (PMAA) homopolymer brushes and random copolymer brushes made by a surface initiated copolymerization to create poly(MAA-co-2-hydroxyethyl methacrylate) brushes P(MAA-co-HEMA). To create dense polyelectrolyte brushes and alleviate problems with polymerization of the reactive electrolytic form of the monomer MAA, these brushes were made by chemical conversion of neutral, precursor brushes comprised of t-butyl methacrylate (tBMA). Neutron reflectivity (NR) was used to investigate the chemical conversion to “deprotected” form. Insight into the swelling behavior of PtBMA and PMAA brushes was obtained by ellipsometry and neutron reflectometry measurements. The responsive behavior of PMAA-containing brushes in different pH environments is evident from in situ ellipsometry and neutron reflectometry measurements, which in particular show significant sensitivity to the amount of water present in the layer as pH is changed. Current efforts to manipulate responsiveness through copolymerization to make P(MAA-co-HEMA) brushes will also be described.

Chaitra Deodhar
University of Tennessee

Date submitted: 27 Dec 2010

Electronic form version 1.4