Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Unimolecular spreading of a molecular brush on adsorbing surface. EKATERINA ZHULINA, Institute of Macromolecular Compounds 199004 St. Petersburg Russia, SERGEY PANYUKOV, Lebedev Physics Institute 117924 Moscow Russia, MICHAEL RUBINSTEIN, University of North Carolina Chapel Hill NC 27599 USA — Using scaling concepts and the analytical self-consistent field theory we explore different conformations of a molecular brush on a planar substrate in nonsolvent environment (air-solid interface). The relationship between architecture and stress in adsorbed macromolecule is determined in terms of spreading parameter, grafting density and degree of polymerization of the side chains. A novel tentlike shape of molecular cross-section as well as rectangular and combined (tentlike + rectangular) conformations are predicted and examined. We demonstrate that strong adsorption of densely branched macromolecules on a planar substrate can lead to stress in molecular backbone sufficient to break covalent bonds.

Ekaterina Zhulina
Institute of Macromolecular Compounds 199004 St. Petersburg Russia

Date submitted: 14 Nov 2007 Electronic form version 1.4