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AFM, NEUTRON SCATTERING AND NEUTRON REFLECTOMETRY INVESTIGATION OF POLY(L-LYSINE)-*GRAFT*-POLY(ETHYLENE GLYCOL) CO-POLYMER CONFORMATIONS IN SOLUTION AND ON THE ADSORBED STATE

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The development of protein-resistant surfaces is of central interest in the context of biosensor chip development and for the design of medical implants in contact with blood. Self-organized films of PEG based co-polymers on different oxide surfaces are one system that has been investigated by a variety of surface characterization techniques in order to establish systematic correlations between the polymer composition/structure, interface architecture and interaction with protein-based biological media.

A class of co-polymeric molecules of special interest is based on a poly(L-lysine) backbone, charged positively due to the presence of protonated amine groups at a neutral pH, and grafted with poly(ethylene glycol) side chains (short: PLL-*g*-PEG). Although the protein-resistant properties of these films have already been demonstrated, little is known about the effect of the co-polymer interfacial architecture on the resulting protein resistance. One of the most important factors turns out to be the polymer conformation in the adsorbed state, which depends not only on the polymer architecture, but also on the environment the polymer is exposed to.

We report results that elucidate the surface conformation of PLL-*g*-PEG of different molecular architecture at various humidity levels in air as well as in contact with aqueous solutions, studied by means of atomic force microscopy (AFM). The experimental results for different polymers are finally compared with neutron scattering and reflectometry results.

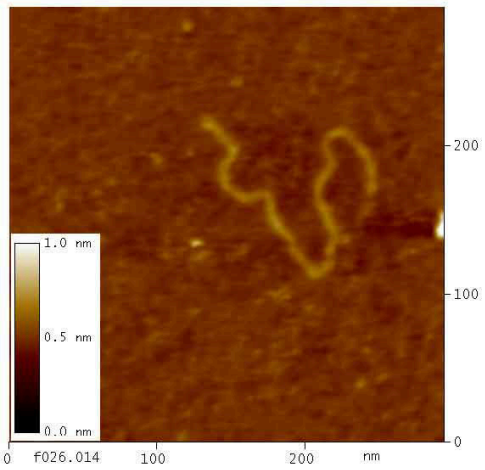

Fig. 1: Single PLL-g-PEG molecule adsorbed on Mica observed with tapping mode AFM in air.