Salt-Induced Control of the Grafting Density in Poly(ethylene glycol) Brush Layers by a Grafting-to Approach - DTU Orbit (08/03/2019)

Salt-Induced Control of the Grafting Density in Poly(ethylene glycol) Brush Layers by a Grafting-to Approach

In this work, a method to obtain control of the grafting density during the formation of polymer brush layers by the grafting-to method of thiolated poly(ethylene glycol) onto gold is presented. The grafting density of the polymer chains was adjusted by adding Na2SO4 in concentrations between 0.2 and 0.9 M to the aqueous polymer solution during the grafting process. The obtained grafting densities ranged from 0.26 to 1.60 chains nm\(^{-2}\), as determined by surface plasmon resonance. The kinetics of the grafting process were studied in situ by a quartz crystal microbalance with dissipation, and a mushroom to brush conformational transition was observed when the polymer was grafted in the presence of Na2SO4. The transition from mushroom to brush was only observed for long periods of grafting, highlighting the importance of time to obtain high grafting densities. Finally, the prepared brush layer with the highest grafting density showed high resistance to the adsorption of bovine serum albumin, while layers with a lower grafting density showed only limited resistance.

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