

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Monitoring the degrafting of polyelectrolyte brushes by using surface gradients¹ YEONGUN KO, JAN GENZER, North Carolina State Univ — Polymer brushes comprise densely grafted polymer chains on surfaces, which possess high stability and high concentration of reactive centers per unit area compared to physisorbed polymer film. Polymer brushes are employed in many applications, including anti-fouling surfaces, cell adhesive surfaces, responsive surfaces, low-friction surfaces, etc. Recently, researchers reported that charged (or chargeable) polymer brushes can be degrafted from substrate while incubated in buffer solutions. Based on previous experiments conducted in our group and by others, we assume that chain degrafting results from the hydrolysis of Si-O groups in head-group of the initiator and/or the ester groups in main body of the initiator. The kinetic of hydrolysis is affected by mechanical forces acting on the initiator. Those forces depend on the molecular weight and the grafting density of the brush, and the concentration and distribution of charges along the macromolecule (tuned by pH - for weak electrolytes - and concentration of external salt). In this work, we study the stability of poly(2-dimethylaminoethyl methacrylate) (PDMAEMA) brushes in two solvents (ethanol and water) at various pH values in water and under different levels of external salt concentration.

¹National Science Foundation

Yeongun Ko
North Carolina State Univ

Date submitted: 11 Nov 2016

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