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**The Effect of Dielectric Constant on Polyelectrolyte Brushes Grafted to a Spherical Substrate** DANIEL SANDBERG, THOMAS SEERY, ANDREY DOBRYNIN, University of Connecticut — Polyelectrolyte brushes have been grown from norbornene-coated Stober silica nanoparticles for study under environments of different dielectric constant and pH by dynamic light scattering techniques. Molecular dynamics simulations were also used to study the effect of dielectric constant on the polyelectrolyte brush structure. Polyelectrolytes, having 60 repeating units and a fraction of charged monomers equal to 1/3, are modeled by evenly spaced charged and uncharged Lennard-Jones particles with a diameter of $\sigma$. Polyelectrolyte chains are grafted to a spherical nanoparticle with a radius of $5.14\sigma$ at grafting densities of 0.277 chains/$\sigma^2$ and 0.544 chains/$\sigma^2$. To model the effect of different dielectric constants we vary the Bjerrum length of the system from $2\sigma$ to $15\sigma$. The brush thickness decreases monotonically with increasing Bjerrum length. This decrease is due to counterion condensation into the interior of the brush, resulting in a reduction of the net brush charge and an increase of the correlation-induced attraction between condensed counterions and charges of the polyelectrolyte chains.

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