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Polyelectrolyte brushes in mixed ionic medium studied via intermolecular forces ROBERT FARINA, NICOLAS LAUGEL, UC-Berkeley, PHILIP PINCUS, UC-Santa Barbara, MATTHEW TIRRELL, UC-Berkeley — The vast uses and applications of polyelectrolyte brushes make them an attractive field of research especially with the growing interest in responsive materials. Polymers which respond via changes in temperature, pH, and ionic strength are increasingly being used for applications in drug delivery, chemical gating, etc. When polyelectrolyte brushes are found in either nature (e.g., surfaces of cartilage and mammalian lung interiors) or commercially (e.g., skin care products, shampoo, and surfaces of medical devices) they are always surrounded by mixed ionic medium. This makes the study of these brushes in varying ionic environments extremely relevant for both current and future potential applications. The polyelectrolyte brushes in this work are diblock copolymers of poly-styrene sulfonate (N=420) and poly-t-butyl styrene (N=20) which tethers to a hydrophobic surface allowing for a purely thermodynamic study of the polyelectrolyte chains. Intermolecular forces between two brushes are measured using the SFA. As multi-valent concentrations are increased, the brushes collapse internally and form strong adhesion between one another after contact (properties not seen in a purely mono-valent environment).

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