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**Macroion induced dehydration of weak polyelectrolyte brushes** ZHONGLI ZHENG, Y. ELAINE ZHU, Univ of Notre Dame — The interaction of macroions, including polyelectrolytes, DNAs, and proteins, with polymer and cellular surfaces is critically related to many biomolecular activities, such as protein adsorption and DNA hybridization at probe surfaces. In an experimental approach to examine the macroion electrostatic interaction with a polymer surface while minimizing the long-debated hydrophobic interaction, we study the interaction of molybdenum-based inorganic polyoxometalate (POM) nanoclusters carrying 42 negative charges as model hydrophilic macroions with surface-tethered poly-2-vinylpyridine (P2VP) brushes immersed in aqueous solutions. By AFM, QCM, and contact goniometer, we have observed the collapse of P2VP chains by adding POM macroions at a constant pH. Surprisingly, added POM macroions can cause the shift of swollen-to-collapse transition pH to a lower value, in contrast to the shift to high pH value by adding simple monovalent salts. At sufficiently high POM concentration, a stable POM-P2VP composite layer, showing little dependence on solution pH and additional salts, can be formed, suggesting a simple route to construct mesoporous polymer membranes.

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