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The Unusual Conformational Behavior of Polyzwitterionic Brushes in Aqueous Solutions JUN MAO, Univ of Chicago, WEI CHEN, Argonne National Laboratory, GUANGCUI YUAN, NIST Center for Neutron Research, National Institute of Standards and Technology, JING YU, Argonne National Laboratory, MATTHEW TIRRELL, Univ of Chicago — Polyzwitterions constitute a peculiar class of polyelectrolytes, which are electrically neutral polymers containing both a positive and a negative charge on each repeating unit. Surfaces coated with polyzwitterionic brushes are resistant to the nonspecific accumulation of proteins and microorganisms, making them excellent candidates for a wide range of antifouling applications, from biocompatible medical devices to marine coatings. The surrounding environment can dramatically influence the conformational behavior of polyzwitterionic brushes. High-density polyzwitterionic brushes poly(2-methacryloyloxyethyl phosphorylcholine) (PMPC) were synthesized using surface initiated atom-transfer radical polymerization, and neutron reflectivity (NR) measurements were performed to investigate the ionic strength dependence of the conformational behaviors of PMPC brushes in monovalent salt solutions. Despite the numerous observations of normal pure polyelectrolyte brushes, NR results showed that both the densely concentrated layer near the substrate surface and the relatively swollen layer into the solution have been observed in different q range in a single neutron reflectivity profile. These results will definitely help us to better understand the relationship between the solution behaviors of zwitterionic polymer brushes and their antifouling properties.

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