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Corona contraction and polyelectrolyte complexation of polybasic micelles in buffered aqueous solution JENNIFER LAASER, YAMING JIANG, THERESA REINEKE, TIMOTHY LODGE, University of Minnesota — We investigate the pH- and ionic strength-induced contraction of polycationic micelles with a polystyrene core and poly(dimethylaminoethyl methacrylate) corona in buffered aqueous solutions, and report on complexation of these micelles with poly(styrene sulfonate) under varying ionic strength conditions. We find that in monoprotic buffers, the micelle corona behaves as a salted osmotic brush, as has been observed for other block polyelectrolyte micelle systems in unbuffered solutions. In polyprotic buffers, however, we find that concentration of the charged buffer species in the micelle corona shifts the buffer dissociation equilibrium farther toward multivalent species than in the bulk, resulting in an anomalously high degree of corona contraction. In our complexation experiments, we observe multimodal size distributions that evolve on timescales of days to weeks at physiologically relevant ionic strengths, which may have implications for the design of gene- and drug-delivery vehicles using these types of interpolyelectrolyte complexes.

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