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Polyelectrolyte brushes (PEBs) can be found in multi-layered conformations, in which comprising chains are permitted in only one layer each. Using our self-consistent field theory (SCFT), we consider the coupling of polymer elasticity, solubility, and electrostatic repulsion to characterize the conformational response of PEBs to charge fraction and hydrophobicity. Calculated end-point distributions are negligible between layers, as each layer is formed from a melt of chains in entropically favored mushroom conformations. To facilitate the experimental validation of our multi-layered PEB conformations, we

. Although our predicted results match well with experimentally measured height profiles of neurofilament-inspired protein brushes, we also report predicted reflectivity spectra for multi-layered PEBs to facilitate the experimental validation of our theory.