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Heteroarm Star Block Copolyampholytes as Templates for Hierarchically-Ordered Polyelectrolyte-Surfactant Complexes MATTHEW HAMMOND, CHAOXU LI, Univ. of Fribourg, Switzerland, CONSTANTINOS TSITSILIANIS, Univ. of Patras, Greece, RAFFAELE MEZZENGA, Univ. of Fribourg, Switzerland — We report on the hierarchical ordering observed in dry, solid samples of polyelectrolyte surfactant complexes based upon a novel heteroarm star block terpolymer bearing short polystyrene (PS) arms and an equal number of longer poly(2-vinylpyridine)- *block*-poly(acrylic acid) (P2VP-*b*-PAA) arms. The ampholytic nature of the star block copolymer allowed for complexation to be carried out on either the P2VP blocks (with negatively charged surfactants) or on the PAA blocks (with positively charged surfactants), depending only on the pH at which the complexation reaction was carried out. X-ray scattering and transmission electron microscopy data reveal that the various complexes display self-organization on the length scale of the polyelectrolyte-surfactant complex (ca. 3 - 4 nm) and on that of the overall copolymer (ca. 20 - 40 nm), with the specific repeat distances and self-organized morphologies being dramatically affected by the choice of block to be complexed. This study clearly illustrates how topological design possibilities in hierarchical self-assembly of block copolymer-based supramolecular complexes can be greatly enhanced by increasing the level of complexity of the macromolecular templates used.

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