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Tunable Surface Properties from Bioinspired Polymers WENDY VAN ZOELEN, ADRIANNE M. ROSALES, University of California, Berkeley, RONALD N. ZUCKERMANN, The Molecular Foundry, Lawrence Berkeley National Laboratory, RACHEL A. SEGALMAN, University of California, Berkeley —
Tunability of surface properties is of importance for a variety of coating applications, including antifouling coatings. We have investigated the surface properties of polypeptoids, a class of non-natural biomimetic polymers based on an N-substituted glycine backbone, that combine many of the advantageous properties of bulk polymers with those of synthetically produced proteins, including controllable chain shape, sequence, and self-assembled structure. We demonstrate the influence of the amount and sequence of hydrophobic monomers in a predominantly hydrophilic peptoid chain on surface properties. Especially the surface reconstruction behavior of block copolymers of these amphiphilic polypeptoids with polystyrene upon contact with water will be addressed. It has been found that surface reconstruction of peptoid chains that contain a sequence of only three fluorinated monomers and up to forty-two hydrophilic monomers occurs within seconds, whereas reorganization of surfaces containing five fluorinated monomers was an order of magnitude slower. Surfaces with higher fluorine content also showed lower settlement of spores of the green algae Ulva.

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