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Behavior of Amphiphilic Helix-Bundle based Peptide-Polymer Conjugates in Solution and at the Air-Water Interface JESSICA SHU, HE DONG, YU-JA HUANG, TING XU, Department of Materials Science and Engineering, UC Berkeley — Amphiphilic peptide-polymer conjugates are a desirable class of materials because they combine the precise chemical structure and functionality of biomolecules, the stability and processibility of synthetic polymers, and the ability to self-assemble into interesting hierarchical nanostructures in solution. As one of the most important motifs underlying many of the functionalities found in natural proteins, coiled-coil helix bundles present unique opportunities to generate functional materials with structures and functionalities similar to those seen in nature. Here, we present fundamental studies, both in solution and at the air-water interface, of amphiphilic helix-bundle based conjugates, where an alkane tail is appended to the N-termini of 3- and 4-helix bundle-forming peptides, and PEG chains are coupled to the exterior of the bundle. Liquid surface reflectivity of Langmuir monolayers indicates that PEG changes the 2D packing behavior of the conjugates, and preliminary DLS and SAXS indicate that they form spherical micelles with diameters in the range of 10 nanometers. Fundamental understanding of the structures that these novel materials form and the interactions that guide their assembly are necessary for controlling multi-length scale assembly in multi-component systems, and may also lead to very unique function biomolecular materials.

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