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Amphiphilic Zwitterionic Coatings for Marine Anti-Biofouling Applications. EDWIN WALKER JR, C. K. PANDIYARAJAN, KIRILL EFIMENKO, JAN GENZER, North Carolina State Univ — Marine biofouling is a problem plaguing the surfaces of cargo ships, military ships and submarines. Previous approaches have relied primarily on the use of Cu-based coatings, which have deleterious effects on aquatic life. Recently, the vast majority of research efforts have focused on the use of polymer brushes synthesized by controlled radical polymerization to create either, the commonly used PEG/PEO materials, amphiphilic alternatives or promising zwitterionic-based moieties. Our approach is based on copolymerizing N, N -2-dimethylaminoethyl methacrylate (DMAEMA) and propargyl methacrylate (PgMA) in different molar ratios (typically, 1:1 and 3:1) using AIBN-based free radical initiator. The copolymers are then betainized with 1, 3- propane sultone to obtain zwitterionic macromolecules. We create substrate-anchored hydrogels by casting the copolymers as films onto polystyrene-based substrates and crosslink them using a photo-active reagent benzophenone. We investigate the cross-linking reaction with IR, the thickness and swelling as a function of ionic strength and electrolyte using spectroscopic ellipsometry and the wettability using water contact angle. We study the resistance of the coatings towards non-specific protein adsorption using fibrinogen and BSA.

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