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Formation and application of functional coatings on synthetic fibers KIRAN GOLI, ALI OZCAM, KRISTEN ROSKOV, RICHARD SPONTAK, ORLANDO ROJAS, JAN GENZER, NC State University — We present two simple methods for modifying synthetic fibers made of polypropylene (PP) and poly(ethylene terephthalate) (PET). Specifically, we alter the inert PP fiber mats by physisorbing denatured proteins, and cross-linking the protein layers using glutaraldehyde. The amino- and hydroxyl-functionalities present in the protein coatings serve as attachment points for polymerization initiators. In addition, PET fibers are modified chemically by amidation with 3-aminopropyltriethoxysilane (APTES), followed by hydrolysis, which yields silanol groups that permit surface attachment of the initiator molecules. “Grafting from” polymerization from such modified PP and PET surfaces is employed following the atom transfer radical polymerization protocol to form functional and responsive polymer coatings. These include arrays of poly(2-hydroxyethyl methacrylate) (PHEMA) as well as chemically-modified PHEMA layers. Selected applications of these functional fibers will be outlined briefly, including, capture of metals or other contaminants from waters, prevention of protein adsorption, and attachment of metallic nanoparticles.

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