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Post-Functionalized Polymer Brushes for Bio-Separation: Tuning GFP Adsorption via Functional Group Display STEVE DIAMANTI, Air Force Research Laboratories, SHAFI ARIFUZZAMAN, JAN GENZER, North Carolina State University, RAJESH NAIK, RICHARD VAIA, Air Force Research Laboratories — An inexpensive and robust biosensor platform that can be tuned to separate and/or detect complex mixtures of biomolecules while minimizing reagents would be of great use for military, homeland security, and medical diagnostic applications. Gradient surfaces of poly(2-hydroxyethyl methacrylate) (PHEMA) brushes have been previously shown to spatially localize biomolecule binding, while minimizing non-specific adsorption of the same biomolecule on other regions of the gradient specimen. In order to further improve the specificity and to provide latent functionality for detection of the binding events, post-polymerization modification of PHEMA with various functional groups has been investigated. Using standard succinimide-based coupling, hydroxyl pendants of PHEMA brushes were conjugated to oligo-peptides, alkanes and oligo(ethylene glycol) (OEG) through an alpha-terminus primary amine. Ellipsometry, contact angle, XPS and ER-FTIR spectroscopy indicated that coupling occurred with efficiencies ranging from 10-40%. Post-functionalization of PHEMA with OEG and hexadecane allows manipulation of the hydrophilicity of the surface and thus tuning of Green Fluorescent Protein (GFP) binding.

Steve Diamanti
Air Force Research Laboratories

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