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Abstract Title: Bioinspired Polymeric Surface Coatings for Applications in Photoelectrosynthetic Fuel Production

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Abstract Body:

Photoelectrosynthetic assemblies provide an approach to capture, convert, and store solar energy as a fuel. However, the ability to effectively assemble the requisite components and control their properties remains an outstanding challenge. Our research group has recently developed a bioinspired synthetic methodology for interfacing polymeric surface coatings to (semi)conducting surfaces. The surface-grafted polymer chains provide: 1) a protective coating for the underpinning surface, 2) appropriate functional groups to direct, template, and assemble molecular components, including catalysts, and 3) a stabilizing three-dimensional environment for catalysts embedded within the polymers. Incorporation of rational synthetic design principles affords further control over the activity of the hybrid assemblies. The reported constructs thus set the stage for an improved understanding of the nano-, meso-, and macro-scale structure−function relationships governing the optoelectronic and catalytic properties of surface-immobilized catalyst−polymer architectures.