

PAPER ID: 2663422

PAPER TITLE: Molecular surface coatings for semiconductor photoelectrochemistry and photocatalysis (final paper number: CATL 218)

DIVISION: Division of Catalysis Science and Technology

SESSION: Light-Driven Chemistry: Photoelectrochemistry & Photocatalysis

SESSION TIME: 8:00 AM - 11:45 AM

PRESENTATION FORMAT: Oral

DAY & TIME OF PRESENTATION: Tuesday, April, 04, 2017 from 10:30 AM - 11:00 AM

ROOM & LOCATION: Cyril Magnin I - Parc 55 San Francisco

Molecular Surface Coatings for Semiconductor Photoelectrochemistry and Photocatalysis

Gary F. Moore, Anna M. Beiler, Diana Khusnutdinova, Brian L. Wadsworth

Catalysts accelerate chemical transformations, but the ability to effectively interface them with surfaces for driving industrially relevant reactions using electricity or sunlight as a power source remains a major challenge. This presentation will report on recent efforts from our research group aimed at developing molecular surface coatings for photoactivating chemical transformations that include capturing, converting, and storing solar energy as a fuel. Addressing this obstacle improves fundamental understanding of catalysis in complex environments and enables technological advancements that depend on the precise control and selectivity of nanoscale components. By designing extended environments for the coordination of molecular catalysts, key features of biological enzymes such as extended ligation spheres, channels for substrate delivery and product removal, as well as regeneration strategies can be integrated with the design and synthesis of human-engineered catalysts. Functionality of these hybrid materials for applications in semiconductor photoelectrochemistry and photocatalysis are examined using electrochemical characterization techniques and an improved understanding of structure and function relationships is achieved using surface-sensitive characterization methods, including grazing angle Fourier transform infrared and X-ray photoelectron spectroscopies.