Design of photo(electro)catalysts for enhanced activity, stability, and selectivity

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The development of photochemical systems capable of mimicking the natural photosynthesis by driving useful chemical transformations has attracted significant interest motivated by the need to meet various environmental concerns and to secure the future supply of clean and sustainable energy. The *activity*, *selectivity*, and *stability* of such systems is determined not only by the ability of materials to absorb light and create charges, but also by efficient separation of the charges and their fast and selective reaction with substrates. In this respect, the development of photo(electro)catalytic materials with suitable surface catalytic properties, as well as effective coupling of well-designed cocatalysts with light absorbers plays a crucial role. The talk will review our recent work on the development of novel photo(electro)catalytic systems for solar water splitting,[1] photocatalytic water remediation,[2] and selective light-driven transformations.[3] The focus will be on mechanistic aspects of enhancing the activity, stability, and selectivity of the photo(electro)catalysts, and on the role of various photoelectrochemical, spectroscopic, and theoretical methods for understanding the performance bottlenecks and further design of more efficient systems.

References

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