

Hybrid Semiconductor–Molecular Systems for Solar–Driven CO₂ Activation

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Abstract:

The great promise of solar fuels as clean energy carriers in the future has stimulated scientists toward the development of cheap, eco-compatible and sustainable processes for CO₂ reduction from sunlight. This presentation will first deal with the development of hybrid solar photoelectrochemical cells (PECs), that integrate efficient and selective molecular catalysts on the surface of high performance semiconducting photoelectrodes. The potential of rarely used semiconductors such as Cu(In,Ga)S₂ chalcopyrite and amorphous hydrogenated silicon (a:SiH) absorbers coated with molecular catalysts will be demonstrated for CO₂ activation. The second part will be devoted to the development of photoactive reticular materials such as MOFs and COFs for photocatalysis. Scope and limitations of these systems will be discussed in the light of other approaches.