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Materials for Catalysis, Synthetic Fuels and Chemical Energy Conversion

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Functional thin-film nanomaterials are becoming increasingly significant for many important applications in industry, for essential catalytic processes and for solar & chemical energy conversion schemes.[1,2] In this pursuit, developing robust and high activity electrocatalytic materials for water oxidation and CO_2 conversion, and their synergistic interfacing with competent light-harvesting modules is very important to progress the construction of solar to fuel conversion system.[3] We have exploited various functional nanoscale materials for catalytic water splitting, CO_2 reduction, and recently for biomass catalysis and solar energy conversion.[3,4] We implemented several molecular, inorganic nanomaterials and metal-oxides displaying great potential to be used in electrocatalysis. Their effective interfacing with semiconductor photo-responsive materials and/or CO_2 reduction systems can provide a potential scheme to make renewable energy supplies.[5] Further we are also exploring catalysis for biomass conversion into chemicals and synthetic fuels opening new ventures for chemicals and energy conversion.

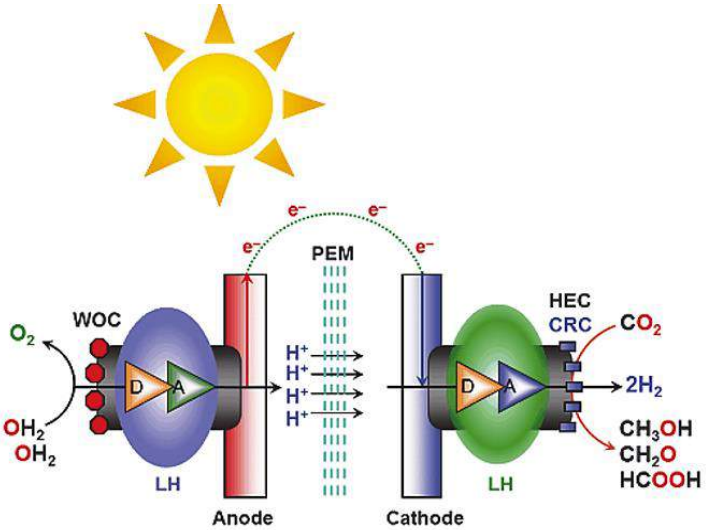

Figure 1. Proposed solar-driven device for catalysis, synthetic fuels and chemical energy conversion.

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