

## Solar-driven H<sub>2</sub> Evolution with Colloidal Semiconductor Nanocrystals

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Solar-driven hydrogen evolution is a topic of great significance for solving the global energy problem by storing abundant solar energy into hydrogen fuel (H<sub>2</sub>). H<sub>2</sub> can be produced through artificial photosynthesis process using solar energy as a driving force to promote reduction of water into hydrogen, coupled with oxidation of a substrate. Waste biomass is ideal oxidation substrates to promote H<sub>2</sub> generation through photocatalytic reforming, promoting both solar-to-H<sub>2</sub> conversion and environmental remediation. The main hinderance we need to overcome is the great kinetical barrier in PR process caused by the recalcitrant polymeric structure of substrates. And the recalcitrant substrates theoretically require a large overpotential for the oxidation half-reaction of substrates. Colloidal semiconductor Nanocrystals (SNC) with their tunable band gap (E<sub>g</sub>) and band edge level controlled by the size, morphology and surface compositions, have the potential of generating oxidizing VB holes with high energy to drive PR conversion. In this work, we focus on designing a novel SNC-based photocatalysts to achieve the H<sub>2</sub> evolution from photo-reforming of biomass.