

Artificial Photosynthesis or Solar Light induced Photocatalytic Activity of Hierarchical N doped TiO₂ Nanostructures and Hybrid Nanocatalyst

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We present sunlight-driven water splitting for H₂ generation on two hybrid catalysts, hierarchical N-doped TiO₂ nanostructured catalysts and metal-oxide hybrid nanocatalysts with ultrathin oxide encapsulation. Au deposited hierarchical N-doped TiO₂ nanostructured catalysts with micro-, meso-, and macroporosity are synthesized by a facile self-formation route. UV-Vis diffuse reflectance spectra confirm the red shift up to 550 nm and band gap narrowing due to the interstitial N species in the TiO₂. The enhanced, sunlight-driven water splitting for H₂ generation (0.53%) is attributed to the synergetic effects of doping and hierarchical porous nanostructures. The present photocatalyst employed may lead to new applications within solar-powered photocatalysis. Metal-Oxide hybrid Nanocatalysts (SiO₂/Pt, Rh, Ru) with ultrathin titania encapsulation have been fabricated. The photocatalytic H₂ production is due to synergetic effect of hybrid nanostructure, metal as co-catalyst, the higher interface area facilitating electron transfer and excellent photostability.