The development of hybrid 1D and 2D nanostructure photocatalysts

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This talk will present recent results on the development of hybrid 1D nanostructures for the photocatalytic generation of hydrogen. Specifically, solution synthesized CdSe nanowires are used to fabricate CdSe/CdS core/shell NWs, which exhibit extended carrier lifetimes. This results in efficient H_2 generation from aqueous solutions. Obtained heterostructures have also been decorated with noble metal nanoparticles to improve charge separation efficiencies. In the realm of 2D nanomaterials, fundamental interest exists in developing nanostructure layered compounds because reducing their dimensionality leads to corresponding changes of their already anisotropic physical and chemical properties. This presentation will show recent work on the solution phase synthesis of thin, highly crystalline, titanium disulfide (TiS_2) nanosheets (NSs). Additional results on the synthesis and characterization of large area amorphous TiS_2 and MoS_x NSs will also be shown.