

Platinum-Incorporated Cadmium Chalcogenide Metal-Semiconductor Hybrid Nanocrystals for Photocatalytic Hydrogen Generation

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Colloidal heterostructured nanomaterials, particularly metal-semiconductor hybrid nanocrystals, have extensively been studied from synthetic procedures, carrier dynamics to various applications such as electrical devices, photocatalysts, bioimaging and so forth. Platinum nanoparticles incorporated into cadmium chalcogenide semiconductor nanocrystals show the photocatalytic hydrogen generation behavior from light-absorbing properties of semiconductors as well as electron scavenging properties of metal. Here, we report the direct decoration of Pt nanoparticles onto CdSe tetrapods synthesized by the continuous precursor injection approach for photocatalytic hydrogen generation applications. Controlled size of Pt nanoparticles onto CdSe tetrapod arms significantly influenced the overall hydrogen generation efficiency, which is expected due to the controlled reduction potential of the Pt nanoparticles. Further detailed synthetic mechanisms and carrier dynamics are also discussed.