Synthesis of Organic-Inorganic Hybrid Nanoparticles for Efficient Visible-Light Driven Photocatalytic Water-Splitting

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With ever-increasing concerns on energy and environment, there has been growing demand for the clean and sustainable energy technologies. Recently, solar production of fuels and valuable chemicals (i.e., artificial photosynthesis) has drawn great attention due to the abundance of solar energy and raw materials (i.e., water, CO2) as well as environmental friendliness. Despite huge efforts made over the past decades, however, there still remains many challenges for its practical application, especially about rational and efficient assembly of individual components for water-splitting. Here, we report the synthesis of organic-inorganic hybrid nanoparticles for efficient photocatalytic water splitting. Our organic-inorganic hybrid nanoparticles were readily prepared by co-assembly of polyelectrolytes with light-harvesting pendent groups and transition metal-substituted polyoxometalate through electrostatic interactions. We also found that the hybridization results in significant enhancement of photocatalytic activity for oxygen evolution under visible light irradiation.