**Advanced Photocatalytic Materials for Solar water splitting**

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**ABSTRACT**

The use of solar energy to drive the chemical and energy processes, along with the chemical storage of solar energy, are imperative for the transition to a low-carbon economy, sustainable and clean society. Solar hydrogen generation through water splitting processes has been developing as an important energy storage alternative. In this context, several approaches involving photocatalytic, photoelectrochemical (PEC) or, coupled photovoltaics, and electrolysis solutions have been widely studied. [1] Photocatalytic hydrogen production for transforming and storing inexhaustible solar energy to green and clean sustainable chemical energy (H2) has been considered as an ideal way to relieve the growing global energy crisis. Although great achievements have been obtained, most of the photocatalysts still suffer unfavorable obstacles, such as weak photocatalytic stability, low efficiency, or toxicity, all of which critically restrict the practical application of the photocatalysis technology. Therefore, developing appropriate photocatalysts that can overcome the above problems is always an essential strategy for the ultimate goal of high-efficiency photocatalytic H2 and O2 production. [2,3]

In the present work, oxide semiconductor/metallic core-shell and heterostructures with carbon nitride were prepared and studied the photocatalytic hydrogen production under solar illumination. Furthermore, SrTiO3 was successfully synthesized followed by surface decoration with Pt particles using the photodeposition method.

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**Fig. 1** TEM images of heterostructures TiO2 with IrO2 nanoparticles, and Carbon nitride with IrO2.

**KEYWORDS:** solar driven H2 production, oxide semiconductor, carbon nitride

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