

A new type of $\text{Rh}_{2-y}\text{Cr}_y\text{O}_3$ loaded $\text{WO}_3/\text{W}/\text{PbBi}_2\text{Nb}_2\text{O}_9$ photocatalyst working under visible light

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Photocatalysts responding to visible light are in great demand in order to utilize the main part of solar spectrum for a large scale hydrogen energy production or waste water treatment, and for indoor applications under weak interior lighting. In water splitting, metal chalcogenides such as CdS have been extensively studied, but they are vulnerable to fatal photocorrosion. A few oxides are also active under visible light such as $\text{HPb}_2\text{Nb}_3\text{O}_{10}$, MgWO_x , and $\text{Ni}_x\text{In}_{1-x}\text{TaO}_4$, yet their activities are very low with quantum yields less than 1%.

In this report, we describe the fabrication of novel nanocomposite photocatalyst powders with the configuration of p-semiconductor/metal/n-semiconductor/ $\text{Rh}_{2-y}\text{Cr}_y\text{O}_3$. The materials are made by combining solid-state reaction (SSR) with chemical vapor deposition (CVD).