

The development of photocatalyst working under visible light

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Perovskite-type oxide materials based on transition metals are efficient photocatalysts for overall water splitting with high quantum yields. However, the band gaps of these materials (ca. 3.8-4 eV) are not adequate for visible light-induced photocatalysis. The development and fabrication of materials showing photocatalytic activity for water splitting into H₂ and O₂ and degradation of organic pollutants under visible light irradiation, therefore, is the most important topic in the photocatalysis research today.

In search of novel oxide photocatalysts with high photocatalytic activity under visible light irradiation, we have investigated a vast number of perovskite-type oxides, and discovered that PbBi₂Nb₂O₉, an Aurivillius phase type layered perovskite containing bismuth (Bi³⁺) was an efficient photocatalyst for water splitting and degradation of organic pollutants under visible light irradiation (420nm).