PL-04

Design and Synthesis of TiO_2-based Heterojunction Photocatalysts for Enhanced Performance

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Titanium dioxide (TiO2) photocatalyst shows broad potential in environmental purification and energy conversion due to its ability to convert light energy into chemical energy at ambient conditions. However, it is still challenge to further increase its photocatalytic efficiency to enhance its perfomance in developing applications.

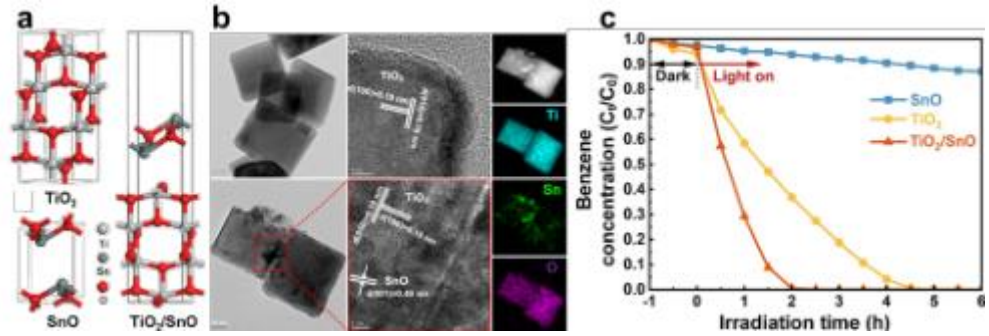

Figure 1 (a) Theoretical models, (b) TEM and HRTEM images, and (c) Benzene degradation curves of SnO, TiO_2, and TiO2/SnO

In our work, the construction of TiO_2-based heterojunctions has been adopted as an effective strategy through enhancement of charge carriers' seperation and carriers' mobility. As an example, figure 1 (a) and Fig. 1 (b) present the constructed models and morphologies of TiO_2, SnO and TiO_2/SnO heterojunction, respectively. The hole mobility of TiO_2/SnO is theoretically estimated as 1122 $cm^2V^{-1}s^{-1}$, which is approximately 86 times faster than that of pristine TiO_2. Figure 1 (c) shows the degradation curve of the gaseous benzene concentration vs time. Compared to TiO_2, the photocatalytic degradation rate has been increased by 125%, and the reaction rate constant is increased by 5.3 times. Thus, the photocatalytic performance of TiO_2-based photocatalysts can be improved by the construction of heterojunctions due to the enhanced charge carriers' separation and improved carriers' mobility.