

Facile Synthesis of MoS₂ Modified TiO₂ Nanospheres with Enhanced Photoelectrocatalytic activity

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MoS₂/TiO₂ nanocomposites composed of MoS₂ nanosheets and TiO₂ nanospheres have been successfully prepared by a facile hydrothermal process. The as-prepared MoS₂/TiO₂ samples with different MoS₂ content have been characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD) and transmission electron microscopy (TEM). The results show TiO₂ nanospheres with uniform size can improve the dispersion and decrease the aggregation of MoS₂ nanosheets. The best morphology and size of MoS₂/TiO₂ nanocomposites can be obtained when the content of MoS₂ is 70 wt% (M-7). UV-vis data show that MoS₂/TiO₂ samples have better absorption in visible light region compared to pure MoS₂ and TiO₂. The photoelectrocatalytic activity of MoS₂/TiO₂ samples has been evaluated by the photocurrent measurement. The results show that MoS₂/TiO₂ nanocomposites with MoS₂ content of 70 wt% (M-7) have the highest photocurrent which implies best photoelectrocatalytic activity of M-7. The reason may be that the suitable content of MoS₂ and the tight junction between MoS₂ and TiO₂ nanospheres is helpful for preventing the recombination of photogenerated electrons and holes.

Keywords: TiO₂ nanospheres; MoS₂; photoelectrocatalytic activity; nanocomposites

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