

Photodegradation of Organic Dye by CoS₂ and Carbon(C₆₀, Graphene, CNT)/TiO₂ Composite Sensitizer

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摘要 CoS₂, CoS₂-C₆₀/TiO₂, CoS₂-CNT/TiO₂, and CoS₂-Graphene/TiO₂ were prepared. The TiO₂ products had the anatase phase structure and interesting surface compositions. X-ray diffraction patterns of the CoS₂-carbon/TiO₂ composites showed a single and clear anatase phase and the CoS₂ structure. Scanning electron microscopy characterization of the texture on the CoS₂-carbon/TiO₂ composites showed a homogenous composition. Energy-dispersive X-ray spectra for elemental identification showed the presence of C and Ti with strong Co and S peaks from the CoS₂-carbon/TiO₂ composites. The composites obtained were also characterized by transmission electron microscopy and UV-Vis spectroscopy. CoS₂-carbon/TiO₂ composites showed excellent photocatalytic activity for the degradation of methylene blue under visible light irradiation. This was attributed to both photocatalysis on the TiO₂ support and charge transfer by the carbon nanomaterial, and the introduction of CoS₂ to enhance transfer of photogenerated electrons.

关键词: [fullerene](#) [carbon nanotube](#) [graphene](#) [cobalt disulfide](#) [titanium dioxide](#) [visible light](#) [methylene blue](#) [photodegradation](#)

Abstract: CoS₂, CoS₂-C₆₀/TiO₂, CoS₂-CNT/TiO₂, and CoS₂-Graphene/TiO₂ were prepared. The TiO₂ products had the anatase phase structure and interesting surface compositions. X-ray diffraction patterns of the CoS₂-carbon/TiO₂ composites showed a single and clear anatase phase and the CoS₂ structure. Scanning electron microscopy characterization of the texture on the CoS₂-carbon/TiO₂ composites showed a homogenous composition. Energy-dispersive X-ray spectra for elemental identification showed the presence of C and Ti with strong Co and S peaks from the CoS₂-carbon/TiO₂ composites. The composites obtained were also characterized by transmission electron microscopy and UV-Vis spectroscopy. CoS₂-carbon/TiO₂ composites showed excellent photocatalytic activity for the degradation of methylene blue under visible light irradiation. This was attributed to both photocatalysis on the TiO₂ support and charge transfer by the carbon nanomaterial, and the introduction of CoS₂ to enhance transfer of photogenerated electrons.

Keywords: [fullerene](#), [carbon nanotube](#), [graphene](#), [cobalt disulfide](#), [titanium dioxide](#), [visible light](#), [methylene blue](#), [photodegradation](#)

收稿日期: 2012-04-05; 出版日期: 2012-08-01

引用本文:

MENG Zeda, OH Wonchun .Photodegradation of Organic Dye by CoS₂ and Carbon(C₆₀, Graphene, CNT)/TiO₂ Composite Sensitizer[J] 催化学报, 2012,V33(9): 1495- 1501

MENG Zeda, OH Wonchun .Photodegradation of Organic Dye by CoS₂ and Carbon(C₆₀, Graphene, CNT)/TiO₂ Composite Sensitizer[J] Chinese Journal of Catalysis, 2012,V33(9): 1495- 1501

链接本文:

[http://www.chxb.cn/CN/10.1016/S1872-2067\(11\)60429-4](http://www.chxb.cn/CN/10.1016/S1872-2067(11)60429-4) 或 <http://www.chxb.cn/CN/Y2012/V33/I9/1495>

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