Electrodeposition of CdS-TiO$_2$ for the Photocatalytic Degradation of Ammonia-Nitrogen Wastewater

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doi: 10.20964/2017.10.14

Received: 10 June 2017 / Accepted: 25 July 2017 / Published: 12 September 2017

In this work, a simple, one-stage electrodeposition strategy was used to prepare a CdS-nanoparticle-sensitized TiO$_2$ (CdS-TiO$_2$) nanotube array. TiO$_2$ nanotubes sensitized by other narrow-band-gap semiconductors were also prepared using this distinct strategy. The CdS-TiO$_2$ hybrid exhibited more desirable physical and chemical characteristics for photocatalytic activity with stronger visible-light-response capacity compared with the original TiO$_2$ material. In comparison with the original TiO$_2$, CdSe/TiO$_2$, and CdTe/TiO$_2$, the catalytic capacity of CdS-TiO$_2$ to ammonia-nitrogen wastewater was higher. The maximum pH value for the CdS-TiO$_2$-induced ammonia-nitrogen removal was 10. Nevertheless, inhibition effects on ammonia-nitrogen degradation were exhibited by all common inorganic ions: Mg$^{2+}$, Ca$^{2+}$, K$^+$, Na$^+$, HCO$_3^-$/CO$_3^{2-}$, SO$_4^{2-}$, NO$_3^-$, and Cl$^-$. 

**Keywords:** Ammonia-nitrogen wastewater; Photocatalysis; Electrodeposition; CdS; TiO$_2$

FULL TEXT

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