



A novel preparation approach and denitrification performance of TiO_2/Fe^0 photocatalysts

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ABSTRACT

Chemical vapor hydrolysis deposition (CVHD), a novel method for preparation of TiO_2/Fe^0 is presented. In the method, tetrabutyl titanate (TBT) and sponge iron (Fe_s) are used as precursor and carrier, respectively. Especially, TBT was hydrolyzed slowly with the thin water vapor to create TiO_2 nanoparticles on the Fe_s carrier. The experiment showed that the optimal preparation conditions for TiO_2/Fe^0 via CVHD were calcination temperature of 723 K and TiO_2 -loading amount of 7.57%. The as-prepared TiO_2/Fe^0 catalysts were evaluated by the catalytic reaction of nitrate reduction, and exhibited a higher catalytic activity and selectivity than the similar catalysts prepared with the typical methods of sol-gel or alkoxide hydrolysis precipitation. The present results demonstrate that the selective nitrate reduction over TiO_2/Fe^0 catalysts with HCOOH as the hole scavenger, highlighting the validity of removal of aqueous nitrate by photocatalysis.

Keywords: Chemical vapor hydrolysis deposition (CVHD); Nitrate; Photocatalysis; TiO_2/Fe^0

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