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Fabrication of magnetically recyclable Ce/N co-doped TiO₂/NiFe₂O₄/diatomite ternary hybrid: improved photocatalytic efficiency under visible light irradiation

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Abstract

Ce/N co-doped TiO₂/NiFe₂O₄/diatomite (CN-TND) hybrid catalyst was prepared via sol-gel method. This ternary composite combined the advantages of three components: adsorption capability of diatomite (Dt), visible-light-driven photoactivity of Ce/N co-doped TiO₂ (Ce/N-TiO₂), and magnetic recyclability of ferrite NiFe₂O₄. The physicochemical properties of CN-TND were characterized by various analytical methods. The visible-light-driven photoactivity of CN-TND was investigated by the degradation of tetracycline (TC) and disinfection of *Escherichia coli* (*E. coli*) under visible light irradiation, and the optimal amount of Ce dopant was determined. In addition, the kinetic data of the degradation process were obtained, and the mechanism of this process was proposed. Different scavengers detected the active species involved during the degradation process. CN-TND exhibited ferromagnetism, thus it could be simply separated from the reactor by an external magnet. The reusability test proved its

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