Preparation of TiO_2/CNT Composite Particles and Application in the Photo-catalytic Degradation of TNT Wastewater

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Abstract: By using tetra-butyl titanate as raw material, TiO_2/CNT composite particles were prepared by peptization- reflux method. Morphology of the samples was observed by scanning electron microscope (SEM) and transmission electron microscope (TEM). X-ray Photoelectron Spectroscopy (XPS) analysis show that Ti-O and —OH groups exist on the surfaces of TiO_2/CNT composite particles, and the difference between binding energies of $Ti2p_{3/2}$ and $Ti2p_{1/2}$ is about 5.7 eV. The photo-catalytic activity of composite particles was studied, and a degradation kinetic model was established by using TNT waste water as target pollutant. Results show that the process of degradation reaction accords with one order reaction kinetics equation. The degradation rate increases with the increase of the initial concentration of TNT in the experimental range, and the kinetic data match well with the L-H model.

Key words: materials science; CNT; nanometer TiO_2; composite particle, TNT; photocatalysis

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高效毁伤弹药以"利用最小化成本获得最大化效果"为目标，对含能材料的性能和能量提出了更高的要求。为进一步促进高效毁伤弹药及其技术的研究，本刊将于2015年增设高效毁伤弹药专栏，内容涉及(1)传统含能材料的优化和改进以及先进含能材料的开发和应用，包括：传统含能材料合成、制造、处理和应用的新方法与新技术，新的CHON含能材料的开发和应用，金属化炸药，非传统概念炸药(如燃料空气炸药、温压炸药)，高能量密度材料；(2)含能材料能量的控制输出研究，包括：能量输出增强(如组合装药)，能量输出聚焦/定向，能量输出模式可控(如多模装药)，能量输出范围可控(如低附带毁伤炸药)。欢迎广大学者投稿，来稿时请选择对应的专栏。

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