

研究论文

乙醇/水体系负载型纳米Cu/Fe二元合金的合成、改性及其还原三氯乙烯的性能

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摘要 在乙醇/水体系中采用 KBH_4 液相还原法, 以石墨微粉为载体, Cu为复合金属, 通过两步法合成了具有球状团簇结构的负载型纳米Cu/Fe二元合金. 与单纯负载型纳米 Fe^0 相比, 该复合材料对三氯乙烯(TCE)具有更高的还原脱氯性能, 纳米 Fe^0 的质量浓度为10 g/L时, 5 h内能将10 mg/L的TCE完全去除. 将十六烷基三甲基溴化铵(CTAB)用于负载型纳米二元合金的表面改性, 改性后的材料对TCE的还原脱氯性能提高. 改性材料连续降解TCE 36 d, 10.2 mg/L TCE在7 h内即完全去除, 材料改性后不易氧化失活, 还原性能保持长期稳定.

关键词 [乙醇/水体系](#) [负载型纳米Cu/Fe二元合金](#) [还原脱氯](#) [三氯乙烯](#) [表面改性](#)

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Preparation and Modification of Supported Nano Cu/Fe Bimetal Alloy in Ethanol-water Solution and Its Reduction-chlorination Property for Trichloroethylene

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Abstract Supported nano Cu/Fe bimetal alloy with a spherical nanocluster structure was synthesized in ethanol-water solution by using KBH_4 as the reducing agent and Cu as the complex metal when micro-scale graphite was used as a support material. This supported nano bimetal alloy showed the better reductive dechlorination property for trichloroethylene than the supported nano Fe^0 in the solution. TCE of 10 mg/L was completely removed in 5 h when Fe^0 dosage was 10 g/L. The cationic surfactant cetyltrimethyl ammonium bromide(CTAB) was used to modify the surface of the supported nano bimetal alloy. The reduction effect of the material for TCE was enhanced after being modified. During the 36 d of continuous dechlorination, the modified supported nano bimetal alloy shows a highly stable property for TCE removal. The experiment results show that 10.2 mg/L TCE could be completely reduced in 7 h by the supported nano bimetal alloy in the 36th day.

Key words [Ethanol-water system](#) [Supported nano Cu/Fe bimetal alloy](#) [Reduction-dechlorination](#) [Trichloroethylene](#) [Surface modification](#)

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