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研究报告

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磁微球负载硝基锌卟啉光催化剂的制备及催化性能研究

**Preparation of nitro zinc porphyrin photocatalyst loaded on magnetic carrier and its photocatalysis property**关键词: [锌卟啉](#) [光催化](#) [有机污染物](#) [活性物种](#)基金项目: [天津市应用基础及前沿技术计划\(No. 11JCZDJC24400\)](#)

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摘要: 以氯化血红素为原料,制备了磁负载的硝基锌卟啉光催化剂.同时,利用热重分析仪(TG)、透射电子显微镜(TEM)、扫描电子显微镜(SEM)和振动磁强计(VSM)对催化剂进行了表征,发现制备的催化剂负载率为32.06%,催化剂为粒径均一的球形壳-核结构,具有良好的磁性.其次,研究了催化剂的催化降解性能.结果表明,磁负载硝基锌卟啉光催化剂在可见光下,对水中的双酚A(BPA)、对硝基苯酚(PNP)等均有90%以上的去除率;对于活性红染料废水的降解也取得了83.67%的降解率.自由基捕获实验证明,电子(e<sup>-</sup>)、羟基自由基(·OH)、空穴(h<sup>+</sup>)和氧自由基(O<sub>2</sub><sup>-</sup>)是降解反应中重要的活性物种.最后通过GC-MS等手段对降解机理进行了研究.

**Abstract:** Hemin was used as a raw material to prepare the nitro zinc porphyrin loaded magnetic carrier for photocatalysis. The catalysts were characterized by thermal gravimetric analysis (TG), transmission electron microscopy (TEM), scanning electron microscope (SEM) and vibrating sample magnetometer (VSM). The results revealed that supporting ratio of the catalyst was 32.06%. Moreover, this catalyst exhibited a pherical core-shell structure with uniform particle diameter and demonstrated good magnetic property. The catalytic degradation performance of the catalyst was further studied. The removal ratios of bis-phenol A (BPA), methyl orange (HIn) and p-nitrophenol (PNP) were higher than 90% under visible light. Also, the degradation of reactive red waste-water reached a high level of 83.67%. Radical trapping experiments showed that electronic (e<sup>-</sup>), hydroxyl radical (·OH), hole (h<sup>+</sup>) and oxygen radical (·O<sub>2</sub><sup>-</sup>) were important active species in the degradation reactions. Degradation mechanism was investigated by GC-MS.

**Key words:** [zinc porphyrin](#) [photocatalytic](#) [organic pollutants](#) [active species](#)

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