Short Communication

Sn⁴⁺-doped dendritic fibrous nanosilica (DFNS) nanoparticles as photocatalyst for degradation of rhodamine B

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This work was done on synthesis of Sn⁴⁺-doped dendritic fibrous nanosilica (DFNS) nanoparticles (Sn-doped DFNS NPs) for photocatalytic degradation of rhodamine B (RHB) dyes as a chemical pollutant. The pure DFNS NPs and Sn-doped DFNS NPs were synthesized through a facile chemical method. The morphologies and crystal structures of the prepared specimens were studied using SEM and XRD analyses which indicated corrugated radial structure and confirmed the doping Sn ion into the DFNS lattice. Electrochemical characterization revealed that the enhancement of specific capacitance in electric double-layer due to the doping Sn ion into the DFNS lattice. The results of photocatalytic degradation of RHB revealed the 82.8% degradation of 40 mg/l of RHB in presence of Sn-doped DFNS NPs were obtained under 120 min visible-light irradiation. These findings exhibited that degradation efficiency of DFNS NPs was significantly improved by doping Sn ions in DFNS NPs under visible irradiation which can be attributed to the high specific surface area of Sn-doped DFNS NPs.

Keywords: Sn-doped dendritic fibrous nanosilica; Photocatalytic degradation; Rhodamine B; Electrochemical property; Visible-light irradiation

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