Mesoporous Nitrogen Doped Zinc Oxide Nanosheets with Enhanced Photocatalytic Activity

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To enhance the photocatalytic performance of zinc oxide materials, nitrogen doped zinc oxide (ZnO:N) nanosheets with mesoporous structure, are prepared by a facile homogeneous precipitation technique. The nanosheets are micron-sized and have a thickness of about 15 nm, and they exhibit a two-dimensional mesoporous network structure that is constructed by interconnected strip-like nanoparticles of about 20 nm in width. As a photocatalyst, the nitrogen doping can reduce the optical band gap of zinc oxide, and the mesoporous network structure can increase the absorption and photochemical reaction interfaces. Consequently, mesoporous ZnO:N nanosheets exhibit significantly improved photocatalytic activity for the photodegradation of rhodamine B (RhB) as well as enhanced photoelectrochemical performance than those of commercial ZnO particles, confirming that the design of material structure and composition is quite effective.

Keywords: Zinc oxide; Nitrogen doping; Mesoporous; Nanosheet; Photocatalytic activity

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