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Synthesis of p-Phenylenediamine from 4-Nitroaniline Using Platinum Doped Lanthanum Hydroxide Nanowires

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Abstract

A hydrothermal method was used to prepare lanthanum hydroxide nanowires, and a photoassisted deposition method was used to deposit platinum on the surface of the La(OH)(3) nanowires. Various techniques, such as BET, XRD, XPS, PL, UV-Vis, and TEM measurements were employed to characterize the prepared samples. Preparation of p-phenylenediamine by photocatalytic reduction of 4-nitroaniline under visible light irradiation was used to determine the photocatalytic performance of the obtained samples. The results indicate that platinum was well dispersed on the La(OH)(3) nanowire surface. In addition, blocking of some of the pores of the La(OH)(3) nanowires due to deposition of platinum metal leads to the lanthanum hydroxide nanowires with a BET surface area that is higher than that of Pt/La(OH)(3) nanowires. The 0.20 wt% Pt/La(OH)(3) nanowires possessed the lowest band gap and highest photocatalytic activity for the reduction of 4-nitroaniline to p-phenylenediamine under visible light irradiation with stable performance after five reuses.

Keywords

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