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FACILE SYNTHESIS OF BISMUTH OXIDE NANOPARTICLES BY A HYDROLYSIS SOLVOTHERMAL ROUTE AND THEIR VISIBLE LIGHT PHOTOCATALYTIC ACTIVITY

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Abstract

The bismuth oxide (Bi_2O_3) nanoparticles are easily synthesized from a solution of bismuth nitrate pentahydrate ($\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$) in ethylene glycol by a hydrolysis solvothermal route at temperatures of 120-150°C. X-ray diffraction, scanning electron microscopy and UV-visible diffuse reflectance spectroscopy are used to characterize the products. The results show that the reaction temperature, the reaction duration and the initial solution concentration play important roles in the formation of the Bi_2O_3 nanoparticles, and all the as-synthesized Bi_2O_3 samples have the cubic phase structure. In addition, studies of the photocatalytic properties by exposure to visible light irradiation demonstrate that the as-obtained Bi_2O_3 nanoparticles show potential photocatalytic application.

Key words: bismuth oxide, nanocrystalline materials, photocatalyst, semiconductors

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