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Rare-earth-doped tungsten oxide microspheres with highly enhanced photocatalytical activities

Le Xu¹, Danxia Gu², Xueting Chang², Linge Chai¹, Zhao Li¹, Xiaokun Jin¹, Shibin Sun^{2*}

¹Central Iron and Steel Research Institute, Beijing 100081, People's Republic of China

²Institute of Marine Materials Science and Engineering, Shanghai Maritime University, Shanghai 200135, People's Republic of China

*Corresponding author. Tel/fax: +86 21 38282611. sunshibin@shmtu.edu.cn

Abstract

Rare-earth-doped WO_{2.72} microspheres (RE-WO_{2.72} MSs) have been successfully synthesized by using a facile solvothermal route with tungsten salt as precursor, RE (RE=Ce, La, and Y) metal salts as dopants, and ethanol as solvent. Results of X-ray diffraction (XRD), X-ray photoelectron spectrometry (XPS), and energy dispersive spectroscopy (EDS) showed that the solvothermal process allowed for the homogeneous doping of WO_{2.72} while maintaining the original crystal structure. The RE doping could effectively engineer the bandgap of WO_{2.72}, which could not only enhance the light-harvesting ability but also deduce up-shift of both the conduction band and valence band. Compared to the undoped WO_{2.72} nanorods (NRs), the RE-WO_{2.72} MSs exhibited highly enhanced photocatalytic properties for the degradation of methylene blue (MB) under full spectrum light irradiation. This work provides a versatile

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