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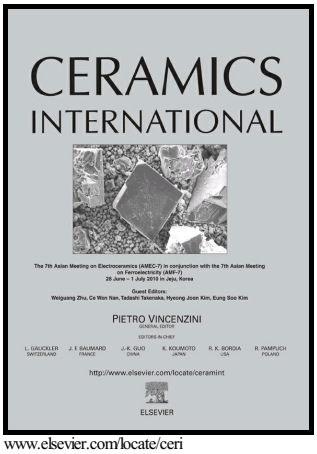

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Rare-earth-doped tungsten oxide microspheres with highly enhanced photocatalytical activites

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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