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Title: Preparation and characterization of CdS/BiOI composites with enhanced photocatalytic activity for degradation of 17 α -ethinyl estradiol

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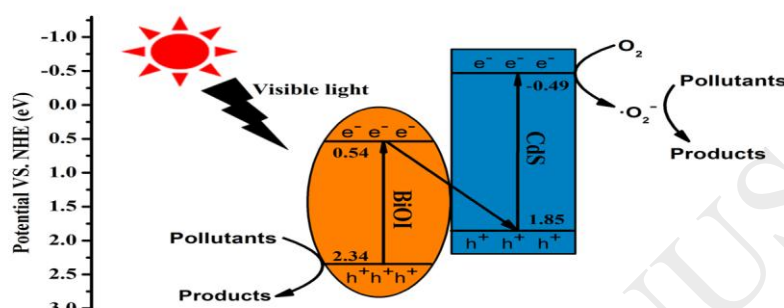
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Preparation and characterization of CdS/BiOI composites with enhanced photocatalytic activity for degradation of 17 α -ethinyl estradiol

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Graphical abstract

Highlights

- A chemical bath deposition method was used for synthesis of CdS/BiOI composite.
- The removal rate of EE2 over CdS/BiOI composite could approach 100% after 12 min under visible light irradiation.
- The Z-scheme mechanism of EE2 degradation by CdS/BiOI was proposed.

Abstract

A novel CdS/BiOI composite has been prepared via a chemical bath deposition method. The physical and chemical properties of as-prepared composites were characterized by XRD, SEM, TEM, EDS, XPS, UV-vis DRS, and PL. The synthesized CdS/BiOI composites exhibited superior photocatalytic activity in photodegrading of 17 α -ethinyl estradiol (EE2) compared to pure CdS and pure BiOI, and the removal rate of EE2 could approach 100% after only 12 min of visible light irradiation using 3:1 CdS/BiOI composite as photocatalyst. The reaction rate constant over 3:1 CdS/BiOI composite was 6.3, 7.1 and 70.9 times higher than that of pure CdS, pure BiOI and P25 respectively. In addition, a Z-scheme charge separation mechanism was proposed on the basis of the experimental results and the theoretical calculation. Moreover, the prepared composite showed good stability and recyclability which are beneficial for its practical application.

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