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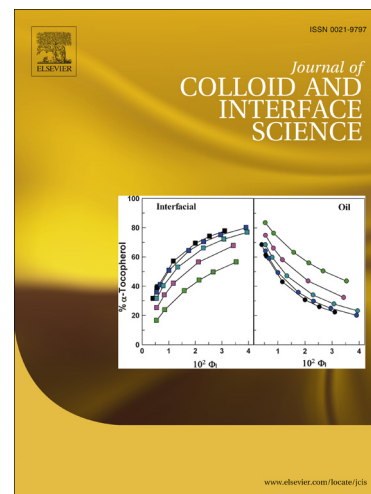
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PbSe-TiO₂ Heteronanojunction Formation by Photocatalytic Current Doubling-Induced Two-Step Photodeposition Technique

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ABSTRACT

PbSe quantum dots (QDs) were formed on TiO₂ by a two-step photodeposition technique. At the first step, UV-light irradiation of TiO₂ in an ethanol solution of H₂SeO₃ yields Se QDs on the TiO₂ surface in a highly dispersed state (Se/TiO₂). At the second step, UV-light irradiation of Se/TiO₂ in an ethanol solution of Pb(ClO₄)₂ transforms Se QDs into several tens of nanometer-sized cubic deposits identified as PbSe (PbSe/TiO₂) by X-ray diffraction, electronic absorption measurements and X-ray photoelectron spectroscopy. Photochronopotentiometry measurements suggested that the PbSe QDs are formed on TiO₂ via the Pb²⁺ ion-assisted reduction of Se particles.

Keywords: Photocatalyst, Photodeposition, Titanium dioxide, Lead selenide, Quantum dot

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