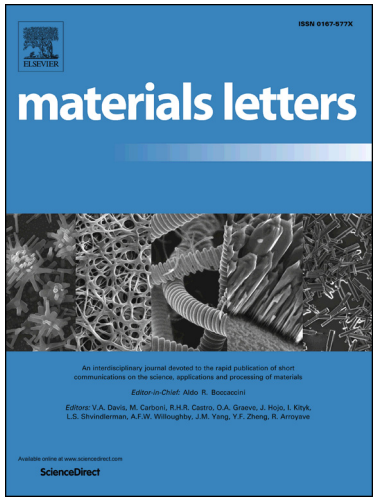

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Abstract

Metallic Bi, as a typical semimetal, has attracted significant attentions due to the highly anisotropic Fermi surface, long carrier mean free path, low carrier density, and small band gap. In this work, metallic Bi self-doping BiOCl (Bi/BiOCl) composites with high photoelectrochemical performance have been synthesized by a facile solvothermal method. A series of characterization methods have confirmed that the metallic Bi has been uniformly distributed on the surface of BiOCl. The introduction of metallic Bi can contribute to enhancing electron transport and separation of photoexcited electrons and holes. As a result, the Bi/BiOCl composites can exhibit superior photocurrent response compared to the pure BiOCl. In addition, ciprofloxacin has been used as target analyte to demonstrate the photoelectrochemical performance of the Bi/BiOCl composites. The Bi/BiOCl modified ITO can display outstanding stability and wide linear range toward the detection of ciprofloxacin. The Bi/BiOCl composites can act as outstanding photoelectrochemical materials for application in photoelectrochemical field.

Keywords: Self-doping; Metallic Bi; BiOCl; Nanocomposites; Semiconductors; Photoelectrochemical performance