

## **Non-metal S-doped bismuth oxychloride for efficient visible-light photocatalytic performance**

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Semiconductor photocatalysis, as a “green” technology, has been used to tackle the energy crisis and environmental pollution issues. However, lacking of visible light absorption and rapid recombination of electrons and holes quietly limits practical applications of the photocatalyst under visible light irradiation. In this work, S-doped BiOCl photocatalysts were synthesized via a one-pot facile solvothermal method using thiourea as the S source. A series of measurements were used to deliver the information of their crystalline structure, morphology, heterostructure interface, surface element composition, optical property and charge transfer. Besides, the photocatalytic activities of S-doped BiOCl were evaluated by the degradation of methyl blue (MB) and Rhodamine B (RhB) under visible light irradiation. The S-doped BiOCl photocatalysts show much higher photocatalytic activity than pure BiOCl for the degradation of MB and RhB. The excellent photocatalytic property is attributed to the strong visible light absorption, the high specific surface area, and the efficient separation of electron-hole pairs. This work could be treated as a basic platform for studying non-metal doping photocatalysts with remarkable photocatalytic performance, which can accelerate to purify the environmental pollution including water and air.