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The g-C_3N_4 surface-decorated $Bi_2O_2CO_3$ for improved photocatalytic performance: From theoretical calculation to practical antibiotics photodegradation in actual water

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To overcome the issue of UV-light response character of $Bi_2O_2CO_3$ due to its wide band gap, we attempted to improve the photocatalytic activity of $Bi_2O_2CO_3$ through g-C_3N_4 surface-decoration, which was primarily evaluated by the theoretical analysis. Subsequently, g-C_3N_4 surface-decorated $Bi_2O_2CO_3$ was successfully prepared via a facile hydrothermal method. It was found that all the g-C_3N_4 surface-decorated $Bi_2O_2CO_3$ samples exhibited enhanced activities for antibiotic tetracycline photodegradation compared with pure $Bi_2O_2CO_3$ upon simulated solar light irradiation, among which the 10 wt% g-C_3N_4 surface-decorated $Bi_2O_2CO_3$ sample showed the highest efficiency. Both first principle calculation and experimental data confirmed that the charge transfered at the interface between g-C_3N_4 and $Bi_2O_2CO_3$ could significantly suppress the recombination of photo-generated electron-holes pairs, thus improving the photocatalytic performance. The mechanism for the enhanced photocatalytic activity was also proposed by the electrochemical measurement and PL testification result. Moreover, the g-C_3N_4 surface-decorated $Bi_2O_2CO_3$ was explored for antibiotics treatment in actual water.

Biography

Huiping Zhao has completed her PhD from Wuhan Institute of Technology in 2017. Her current research is concentrated on developing novel bismuth-related nanostructure materials for environmental remediation.

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