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Title: Construction of 2D heterojunction system with enhanced photocatalytic performance: plasmonic Bi and reduced graphene oxide co-modified Bi<sub>5</sub>O<sub>7</sub>I with high-speed charge transfer channels

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**Construction of 2D heterojunction system with enhanced photocatalytic performance:  
plasmonic Bi and reduced graphene oxide co-modified Bi<sub>5</sub>O<sub>7</sub>I with high-speed charge  
transfer channels**

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**Highlight**

- 1 The unique 2D heterojunction system was fabricated through a facile surface charge mediated self-assembly strategy.
- 2 The typical heterojunction could provide large amount of charge channels facilitating the charge separation and transfer.
- 3 Semimetal Bi was introduced into the heterojunction system by in-suit reduction method with PVP as protective agent.
- 4 The local electromagnetic field induced by SPR effect of Bi was favorable for charge pair separation.

**Abstract**

The efficient electron-hole charge pair separation, ultra-fast electron migration and excellent light harvest capacity are essential for semiconductor photocatalyst with superior photocatalytic performance. In this study, we constructed layered 2D/2D heterojunction composite of Bi@Bi<sub>5</sub>O<sub>7</sub>I/rGO (BiBGOI) through a facile surface charge mediated self-assembly strategy. The unique 2D/2D heterostructure with face to face contact can increase the contact area and generate a large amount of charge transfer nanochannels in the interfacial heterojunction, resulting in the enhancement of photocatalytic activity. Addition of semimetal

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