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Fluorescein-sensitized Au/g-C_3N_4 nanocomposite for enhanced photocatalytic hydrogen evolution under visible light

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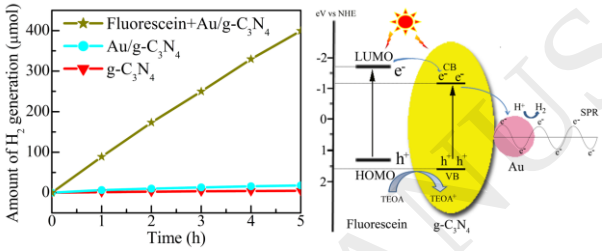
Graphical abstract

Fluorescein-sensitized Au/g-C_3N_4 nanocomposite significantly enhances the visible light photocatalytic activity for H_2 evolution from water in the presence of triethanolamine as sacrificial electron donor.



Highlights

- Preparation of Au/g-C_3N_4 composite through protonation, adsorption and reduction.
- Au nanoparticles with average diameter of 4.1 nm are homogeneous deposited on g-C_3N_4.
- The H_2 evolution rate of Au/g-C_3N_4 raises by 22 times after fluorescein sensitization.
- Efficient transfer of photo-generated electrons among fluorescein, g-C_3N_4 and Au.

Abstract

Au/g-C_3N_4 composite is prepared through protonation of g-C_3N_4, followed by electrostatic adsorption of $AuCl_4^-$ and subsequent chemical reduction. The homogeneous deposition of Au nanoparticles with an average diameter of 4.1 nm on g-C_3N_4 is confirmed by TEM measurement. Compared with pure g-C_3N_4, Au/g-C_3N_4 composite exhibits a significant improvement in the photocatalytic activity for H_2 production from water in the presence of triethanolamine as sacrificial electron donor under visible light irradiation (λ > 420 nm). Significantly, the rate of H_2 production