

Facile synthesis of N-CQDs@S-gC₃N₄ composite for enhanced visible-light photocatalysis of methylene blue

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This study explores the facile synthesis of N-doped Carbon quantum dots decorated onto the interlayers and surface of S-doped g-C₃N₄ pinhole nanosheets with porous structure via simple facile hydrothermal method. The existence of N-CQDs and S-gC₃N₄ phases in the N-CQDs/S-g C₃N₄ composite was confirmed by XRD, FTIR and TEM techniques. The N-CQDs/S-gC₃N₄ composite exhibited an enhanced photocatalytic performance on aqueous methylene blue dye under visible light with respect to undoped S-gC₃N₄. The dye degradation of ~40% and 92% was noticed for S-doped g-C₃N₄ and N-CQDs/S-gC₃N₄ photo catalyst, respectively after 60 min of irradiation. The enhanced photocatalytic activity of the N-CQDs/S-gC₃N₄ was attributed to its negative zeta potential for electrostatic interaction with cationic dye and the pinhole porous structure can provide more active sites which can induce faster transport of the charge carrier over the surface. Moreover, the N-CQDs are favourable for trapping electrons and promoting the separation of photo generated electron-hole pairs in S-gC₃N₄.