Title:	Synthesis of Pd loaded g-C 3 N 4 /Cu 2 O nanocomposite heterostructures for efficient photocatalytic Suzuki cross-coupling reactions
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Abstract:	Engineering of an effective photocatalysts is very essential for the efficient solar to chemical energy conversion in photocatalytic C-C coupling reaction. Herein, for the first time, we report an effective approach for designing Pd nanoparticles (NPs) on g-C 3 N 4 /Cu 2 O nanocubes (NCs) heterojunction, resulting in hybrids with extraordinary photocatalytic activity in Suzuki Miyaura Cross-Coupling reactions under visible light. The combination of g-C 3 N 4 and Cu 2 O improves the visible light absorption efficiency and also suppress the charge recombination. Visible light irradiation generates excited electrons which gets transfer to the Pd NPs, making it electron-rich and accelerates the rate-determining step, thereby the oxidative addition of aryl halides. Pd/g- C 3 N 4 /Cu 2 O NCs heterojunction showed the highest turnover frequency (2400 h −1) for photocatalytic C-C coupling reactions among previously reported photocatalysts. The as- prepared Pd/g-C 3 N 4 /Cu 2 O NCs heterojunction exhibited excellent photocatalytic activity as compared to the Pd/g-C 3 N 4 and Pd/Cu 2 O NCs composite under visible light irradiation, suggesting the better charge-separation through Z-scheme in case of Pd/g-C 3 N 4 /Cu 2 O. The heterojunction material also showed high recyclability in Suzuki cross-coupling reactions. This provides an efficient photocatalytic route for preparation of biaryl compounds and a facile strategy to design novel photocatalysts for various organic transformations reactions driven by visible light.
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