Title:	Coupling of Carbon Nitride (g-C2N4) and Hole Accepting Red-Emissive Carbon Dots: For Enhanced Photocatalytic Fuel Generations
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Abstract:	Photocatalysis is a promising technology for efficient solar-to-chemical energy conversion. Developing effective photocatalysts is essential for efficiently generating fuels from renewable energy sources such as water. Among the various photocatalysts, graphitic carbon nitride (g-C 3 N 4) has been considered a promising candidate for photocatalytic applications due to its unique electronic and structural properties. However, the photocatalytic activity of g-C 3 N 4 is limited by its narrow absorption range and high recombination rate of photoinduced charge carriers. Polythiophene Carbon dots (PTH- CDs) have emerged as a potential candidate for enhancing the photocatalytic activity of g-C 3 N 4 due to their tunable bandgap and excellent hole-accepting ability. PTH-CDs can effectively extend the absorption range of g-C 3 N 4 to the visible light region, thus promoting solar energy utilisation effective approach for designing PTH-CDs on g-C 3 N 4 heterojunctions for enhanced photocatalytic fuel generation. The synthesised PTH-CDs were uniformly distributed on the surface of graphitic carbon nitride(g-C 3 N 4), forming a well-defined heterojunction structure. The resulting hybrid photocatalysts exhibit significantly enhanced photocatalytic hydrogen production activity compared to pure g- C 3 N 4 under visible light irradiation. The optimised PTH-CDs/ g-C 3 N 4 hybrid photocatalysts show a hydrogen production rate of 2400 μM in 4 hours, which is six times higher than that of pure g-C 3 N 4 .
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