Polymeric Photocatalysts Based on Graphitic Carbon Nitride

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Abstract

Semiconductor-based photocatalysis is considered to be an attractive way for solving the worldwide energy shortage and environmental pollution issues. Since the pioneering work in 2009 on graphitic carbon nitride (g-C3N4) for visible-light photocatalytic water splitting, g-C3N4-based photocatalysis has become a very hot research topic. This review summarizes the recent progress regarding the design and preparation of g-C3N4-based photocatalysts, including the fabrication and nanostructure design of pristine g-C3N4, bandgap engineering through atomic-level doping and molecular-level modification, and the preparation of g-C3N4-based semiconductor composites. Also, the photocatalytic applications of g-C3N4-based photocatalysts in the fields of water splitting, CO2 reduction, pollutant degradation, organic syntheses, and bacterial disinfection are reviewed, with emphasis on photocatalysis promoted by carbon materials, non-noble-metal cocatalysts, and Z-scheme heterojunctions. Finally, the concluding remarks are presented and some perspectives regarding the future development of g-C3N4-based photocatalysts are highlighted.

Keywords

KeyWords Plus: VISIBLE-LIGHT IRRADIATION; IN-SITU SYNTHESIS; ENHANCED HYDROGEN EVOLUTION; ORGANIC POLLUTANTS DEGRADATION; SINGLE-LAYER GRAPHITIC-C3N4; TEMPLATE-FREE FABRICATION; METAL-FREE HETEROJUNCTION; REACTABLE IONIC LIQUID; CDS QUANTUM DOTS; HIGHLY EFFICIENT

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