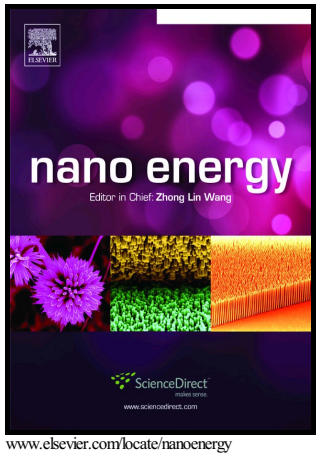

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Freestanding Atomically-Thin Two-Dimensional Materials beyond Graphene Meeting Photocatalysis: Opportunities and Challenges

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Abstract

Atomically-thin two-dimensional materials can afford promising opportunities for various photocatalytic applications thanks to its unique structure and fascinating properties. However, the understanding of their clear relationship between structure and activity is difficult and insufficient. In this review, various strategies for preparation of atomically-thin 2D materials have been surveyed. Then, the structure-activity relationship insights have been highlighted from three crucial factors of photocatalysis namely light harvesting, charge separation and interfacial reactions, by surveying the recent developed freestanding atomically-thin photocatalysts. Various activity improvement strategies for atomically-thin 2D materials, such as element doping, defect engineering, active sites enlarging, etc. have been proposed. Finally, the opportunities and challenges of atomically-thin two-dimensional materials for photocatalysis has been presented to satisfy people's