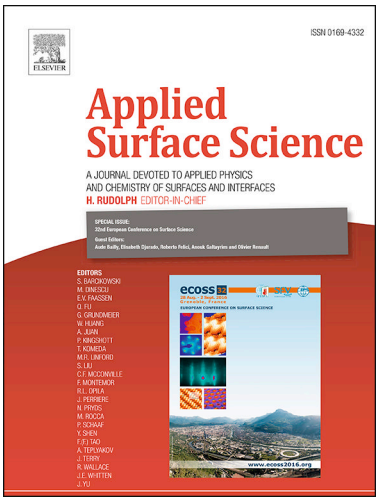

Full Length Article

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Vopor-polymerization strategy to carbon-rich holey few-layer carbon nitride nanosheets with large domain size for superior photocatalytic hydrogen evolution

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Abstract

Ultrathin graphitic carbon nitride (CN) nanosheets, especially large-size holey few-layer materials have attracted great attention but are rarely reported in the phocatalysis field. Hence, an uncomplicated vopor-polymerization strategy is used to obtain a novel sample of carbon-rich holey few-layer CN nanosheet with large domain size (S-ACN) using the oxygen in-situ regulation. Interestingly, the same preparation strategy synthesizes the carbon-rich amorphous hollow-cubic CN materials (S-NCN) without the oxygen in-situ regulation. Consequently, the optimized S-ACN exhibits marked improvement in photocatalytic hydrogen evolution, by nearly 21.8 times compared with the bulk CN (ACN). The carbon-rich S-ACN with few-layer structures and copious in-plane holes displays an excellent photocatalytic activity due to the unique structural advantages for the synergistic effect of light absorption, abundant active sites, and efficient separation of photoproduced electron-hole pairs. It is a green and facile strategy for the fabrication of large-size holey few-layer nanosheets for the other transformations including organic synthesis process, environmental remediation, and CO_2 reduction.

Keywords: Graphitic carbon nitride; Carbon rich; In-plane holes; Few-layer; Hydrogen evolution