TiO2 nanosheets with exposed {001} facets for photocatalytic applications

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Abstract

TiO2 nanosheets with highly reactive {001} facets ({001}-TiO2) have attracted great attention in the fields of science and technology because of their unique properties. In recent years, many efforts have been made to synthesize {001}-TiO2 and to explore their applications in photocatalysis. In this review, we summarize the recent progress in preparing {001}-TiO2 using different techniques such as hydrothermal, solvothermal, alcohothermal, chemical vapor deposition (CVD), and sol gel-based techniques. Furthermore, the enhanced efficiency of {001}-TiO2 by modification of carbon materials, surface deposition of transition metals, and non-metal doping is reviewed. Then, the applications of {001}-TiO2-based photocatalysts in the degradation of organic dyes, hydrogen evolution, carbon dioxide (CO2) reduction, bacterial disinfection, and dye-sensitized solar cells are summarized. We believe this entire review on TiO2 nanosheets with {001} facets can further inspire researchers in associated fields.

Keywords

Author Keywords: TiO2; nanosheets; {001} facets; photocatalysis

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