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Journal of Materials Science: Materials in Electronics

Volume 31, Issue 14, 1 July 2020, Pages 11434-11447

Enhanced photoactivity of cerium tungstate-modified graphitic carbon nitride heterojunction photocatalyst for the photodegradation of moxifloxacin(Article)

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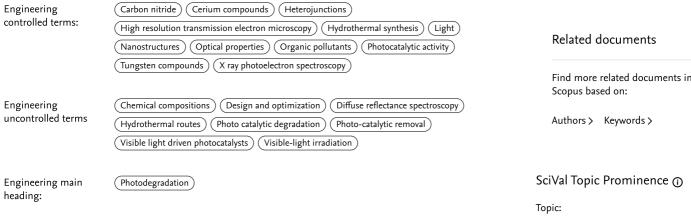
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Abstract

Design and optimization of visible-light-driven photocatalysts for degradation of organic pollutants is an important step towards environmental decontamination. In this study, wolframite cerium tungstate (Ce2(WO4)3, (CW)) hybridized with g-C₃N₄ (CN) nanosheets was synthesized via a simple hydrothermal route followed by an ultrasound-assisted synthesis method. The prepared Ce₂(WO₄)₃@ g-C₃N₄ (CW@CN) heterojunction was investigated for photocatalytic degradation of the antibiotic moxifloxacin (MXF) under visible light irradiation. Structural, morphological, and optical properties as well as chemical composition of the as-synthesized heterojunction were investigated by transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), UV–Vis diffuse reflectance spectroscopy (UV–Vis DRS) and photoluminescence (PL). MXF photocatalytic degradation by the binary nanostructure ($Ce_2(WO_4)_3$ @ g- C_3N_4) (94.1%) was the highest compared to g-C₃N₄ (53.6%) and Ce₂(WO₄)₃ (46.4%). Such enhanced activity could be ascribed to efficient suppression of the charge carriers' recombination, leading to adequate formation of the reactive species responsible for MXF degradation. Furthermore, the $Ce_2(WO_4)_3@$ g-C₃N₄ heterojunction showed remarkable stability over five consecutive cycles, with only 11.5% reduction after the 5th cycle. This work established the potential applicability of Ce₂(WO₄)₃@ g-C₃N₄ nanostructures towards photocatalytic removal of MXF. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

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(2024) Materials

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DOI: 10.1007/s10854-020-03692-1 Document Type: Article Publisher: Springer

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