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EDITORIAL

Advanced nanostructured photocatalysts for innovative photocatalytic applications

Editorial

To date, the field of photocatalysis has been expanded rapidly and investigated widely. Significant progress and considerable efforts have been devoted to exploring nanomaterials photocatalysts. This approach has opened a new avenue for the potential and alluring photocatalytic applications towards renewable energy, environmental remediation, essential organic compounds, essential chemical synthesis, etc. In this Special Issue of "*Advanced Nanostructured Photocatalysts for Innovative Photocatalytic Applications*" in the **Arabian Journal of Chemistry**, the recent literature on the near infrared-driven photoelectrochemical water splitting (Hsieh et al., 2020), photocatalytic remediation of persistent organic pollutants (Nguyen et al., 2020b), engineering nanostructures of CuO-based photocatalysts for water treatment (Raizada et al., 2020), silver halides and graphitic carbon nitride-based photocatalysts for energy and environmental applications (Thakur et al., 2020), and pollutants degradation as well as power generation by photocatalytic fuel cells (Vasseghian et al., 2020), has been successfully reviewed. Herein, the critical summary of previous studies, challenges, and prospects for future directions to promote photocatalysis are highlighted. It notes the current photocatalytic efficiencies have been limited by various factors, including the inactiveness under visible light irradiation, the quick recombination of the photogenerated electron-hole pairs, etc. Hence, several efforts have made substantial contributions to promoting photocatalysis. The cutting-edge synthesis approaches toward advanced and novel nanostructured materials, such as benign biological method (Chand et al., 2020; Diko et al., 2020; Harjati et al., 2020), thermal decomposition and reduction technique (Ahmad and Yasin, 2020), surfactant-free hydrothermal route (Botsa et al., 2020), co-precipitation method (Fegade et al., 2020), metal-assisted chemical etching method (Hsu et al., 2020), sol-gel procedure (Mancuso et al., 2020; Nguyen et al., 2020a), solvothermal method (Nguyen et al., 2020b), and selective structure and morphology by changing the precursors (Chang et al., 2020), are thoroughly described and assessed for physicochemical attributes by state-of-the-art characterization techniques and photocatalytic performance in various advanced photoreactors. Additionally, numerous applications on the photocatalytic degradation of organic pollutants (Ahmad and Yasin, 2020; Berkani et al., 2020; Botsa et al., 2020; Chand et al., 2020; Diko et al., 2020; Fegade et al., 2020; Harjati et al., 2020; Mancuso et al., 2020; Nguyen et al., 2020a; Nguyen et al., 2020b; Pham et al., 2020; Vasseghian et al., 2020), photocatalytic production of hydrogen peroxide (Chang et al., 2020), photocatalytic antibacterial disinfection (Thakur et al., 2020), CO_2 conversion to hydrocarbon fuels (Thakur et al., 2020), photoelectrochemical water splitting (Hsieh et al., 2020), are used to evaluate the performance of photocatalytic nanomaterials. Looking forward to improved photocatalytic systems with more practical conditions, Berkani et al. combined a Box-Behnken design technique with response surface methodology (Berkani et al., 2020). In this study, they successfully investigated the influence of various experimental parameters, such as the initial concentration of the dye, flow rate, and UV intensity, etc., to optimize the photocatalytic mineralization of C.I. Basic Red 46 dye from an aqueous solution. We believe that this Special Issue presents much of the recent advances in the research frontiers involving novel and advanced semiconductor photocatalysts and their promising implementations. An obvious benefit of photocatalysis is expected to provide a green and promising solution of global energy and environmental issues in the coming years.

Finally, the Guest Editors would like to thank all the authors and contributors of this collection. We sincerely appreciate all the reviewers' efforts for their precious time, patience, and valuable comments to appraise and improve the quality of submitted manuscripts. Specially, we are grateful to the Editor-in-Chief Prof. Abdulrahman Abdullah Alwarthan and the entire Editorial Board of the **Arabian Journal of Chemistry** for their worthy guidance and offering us the valuable opportunity to compile this Special Issue. The untir-

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