CHAPTER

19

A critical analysis of modification effects on nanostructured TiO_2-based photocatalysts for hydrogen production

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19.1 Introduction

The utilization of energy derived from fossil sources often results in a series of environmental issues that result from emissions of greenhouse house gases (GHGs) (Ayodele et al., 2017). The emitted greenhouse gases have been reported as the main causes of the greenhouse effect, which in turn is responsible for climate change (Karmaker et al., 2020). These myriads of constraints associated with the use of fossil fuel energy have aroused research interest in renewable and cleaner energy sources (Ayodele et al., 2019a; Baykara, 2018; Syed Muhammad et al., 2018). One of such renewable and a cleaner energy source is hydrogen and has been projected as the energy of the future (Al-Zareer et al., 2018). The use of hydrogen as fuel in an internal combustion engine or fuel cell is associated with zero emissions when combusted with oxygen (Kormos et al., 2019; Mekhilef et al., 2012). In comparison with other sources of energy, hydrogen energy is highly efficient, economically competitive, and environmentally advantageous (Sharma and Ghoshal, 2015). Hydrogen can be produced by thermochemical, biochemical, and photocatalytic processes, as depicted in

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