THE STUDY OF SILVER (Ag) SUPPORTED CO-CATALYST ON g-C_3N_4/TiO_2 FOR PHOTODEGRADATION OF REACTIVE RED 4

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This Final Year Project Report entitled "The Study of Silver (Ag) Supported Co-Catalyst on g-C_3N_4/TiO_2 for Photodegradation of Reactive Red 4" was submitted by Nur Qistina Aisyah Binti Anuar in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

THE STUDY OF SILVER (Ag) SUPPORTED CO-CATALYST ON g-C_3N_4/TIO_2 FOR PHOTODEGRADATION OF REACTIVE RED 4

Untreated pollutants released into the environment from diverse sources making it difficult to be treated. One of the most promising wastewater treatment technologies in this area is photocatalysis. However, the photocatalytic efficiency of single semiconductor photocatalysts under visible light is limited and needs further improvements. To enhance the photocatalytic activity, researchers have coupled semiconductors with desirable matching electronic bandgap and doped semiconductor photocatalysts with metal. When two photocatalysts with different bandgaps are combined, electron/hole pairs separate greatly which creates more species for reactions to degrade organic pollutants. In this study, the g-C_3N_4/TiO_2 with controlled composition of mass ratio 10:90 was synthesized by a simple calcination. LED light irradiation was used to compare the photocatalytic performance of the modified and unmodified semiconductors. RR4 dye was chosen as model pollutant to test the photodegradation efficiency. The results shows that RR4 completely degraded with reaction rate of 0.0737. The Ag- g-C_3N_4/TiO_2 with optimum concentration of 900 ppm were synthesized by the photodeposition method. After adding silver (Ag), the photodegradation of g-C_3N_4/TiO_2/Ag was investigated, and the reaction constants were determined which is 0.0801. These results indicated that the degradation performance of organic dyes for g-C_3N_4/TiO_2/Ag was obviously improved compared with coupling semiconductor g-C_3N_4/TiO_2 and single semiconductors g-C_3N_4 and TiO_2 with 98.89% in an hour. Silver (Ag) doped was confirmed by ICP-OES characterization. Following FTIR and XRD characterization, the chemical structures and bonds were investigated. This research is in line with Sustainable Development Goal (SDG) 6 under the category of clean water and sanitation as it plays a crucial role in achieving target 6.3 that especially focuses on the wastewater treatment.