PHOTOCATALYTIC ACTIVITY STUDY OF SULFUR DOPED GRAPHITIC CARBON NITRIDE PREPARED USING THIOUREA AS PRECURSOR AT DIFFERENT HEATING CONDITIONS

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FEBRUARY 2024

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Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
in the faculty of Applied Sciences
Universiti Teknologi MARA

FEBRUARY 2024

This Final Year Project Report entitled "**Photocatalytic Activity Study of Sulfur Doped Graphitic Carbon Nitride Prepared Using Thiourea as Precursor At Different Heating Conditions"** was submitted by Nurul Ain Najihah Binti Abdul Rahim in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Science, and was approved by

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ABSTRACT

PHOTOCATALYTIC ACTIVITY STUDY OF SULFUR DOPED GRAPHITIC CARBON NITRIDE PREPARED USING THIOUREA AS PRECURSOR AT DIFFERENT HEATING CONDITIONS

Graphitic carbon nitride (g-C_3N_4) is a polymer with a structure similar to graphene, consisting of carbon and nitrogen atoms arranged in a graphitic structure. It has unique electronic and structural properties that make it suitable for photocatalytic processes. It also has advantages such as low manufacturing cost, high quantum yield, and nontoxicity. This study aims to determine photocatalytic performance of sulfur doped g-C_3N_4 synthesized from thiourea under different heating conditions, presenting a novel approach to metal-free photocatalysis for wastewater treatment. Various heating rates (1, 3, 5, and 10 °C/min) at various temperatures (400, 450, 500, and 550°C) are the parameter condition in preparing S-g-C_3N_4. The produced g-C_3N_4 performed FTIR analysis, which identifies various functional groups. The primary peaks were located at 800-1000 cm^{-1} (C-N-C), 1200-1700 cm^{-1} (C=N and C=C), 2100-2140 cm^{-1} (C≡C), and 2700-3200 cm^{-1} (N-H/O-H) referring to prepared sample of sulfur doped g-C_3N_4 The sample 450(3) shows a pure g-C_3N_4 composition, as evidenced by the absence of the C-N located between 2100 and 2140 cm^{-1}. The photocatalytic degradation of prepared samples was observed using reactive red 4 (RR4) dye as a model pollutant. 450(3) shows the optimum pseudo first order rate constant with 0.0373 min^{-1} where it is 11.6 times faster as compared with 500(3) sample.This research contributes to the 10-10 MySTIE initiative, offering insights into advanced materials and environmental biodiversity. The findings provide valuable implications for the synthesis and application of g-C_3N_4 as a sustainable and effective metal-free photocatalyst in wastewater treatment processes.

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