

**CHARACTERIZATION OF HYBRID
DIMERCAPTOSUCCINIC ACID COATED
Fe₃O₄/GOLD CORE-SHELL NANOPARTICLES FOR
CATALYTIC DEGRADATION OF WATER
CONTAMINANTS**

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The aims of this study are to characterize Dimercaptosuccinic Acid (DMSA) coated iron oxide/gold core-shell nanoparticles and identify its feasibility towards water remediation application. In order to achieve the final structure of the catalyst, one by one synthesis need to be done. Iron oxide nanoparticles (IONPs) was synthesized using co-precipitation method and gold nanoparticles (AuNPs) was synthesized by citrate reduction method. Optical absorption spectra towards the synthesis of gold nanoparticles (AuNPs) was done by the Ultraviolet Visible Spectrophotometer (UV-VIS) while the morphology of the final structure was determined by Transmission Electron Microscopy (TEM). The feasibility of the catalyst was tested towards chloramphenicol and rhodamine b base dye. For the degradation of chloramphenicol using catalyst and sodium borohydride the percentage was 32%. The study proceeded by using rhodamine b base with hydrogen peroxide and the degradation achieved was 12%. However, with both sodium borohydride and hydrogen peroxide, the percent degradation reached up to 82%. The result revealed that DMSA coated iron oxide/gold core-shell nanoparticles can be further synthesis in order to obtain a perfect morphology and thus improve the degradation efficiency by only using a single reducing agent.

Keywords: DMSA, iron oxide nanoparticles, gold nanoparticles, polyethylenimine, chloramphenicol, rhodamine b base.