

**INVESTIGATION OF MODIFIED ALUMINA
MATERIAL FOR REMEDIATION OF
CONTAMINATED OIL: A REVIEW**

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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, unless otherwise indicated or acknowledge 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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SUPERVISOR'S CERTIFICATION

I declared that I read this thesis and in my point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

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ABSTRACT

Human population and demand for clean water are found to be increased by years. This increases also parallel to the rapid growth of industrial activity. However, this indicates that there will be increased in production of oily wastewater. Food processing industry, electroplating industry and oil refinery industry are some of the major contributor of oily wastewater. Oil in water may create environmental issue such as kills aquatic life, eutrophication, disturb quality of water, and cause water pollution. Due to these reasons, it is important for oil to be separated and removed from water. The removal of oil from water can be performed by several conventional method such as coagulant and flocculation, flotation, and biological degradation. However, the performance of conventional methods in wastewater treatments showing insignificant effect as its drawbacks to the environment such as large volume of sludge produced and high cost of reagents. However, adsorption by alumina have shown a promising potential to be developed as new material for wastewater treatment attributed by its modifiable surface area and high sorption capacity. Sol-gel method is highlighted as the modification route for materials' morphology and topography due to its simplicity. In this review, literature review, benchmarking, quantitative and qualitative data collection, verification, and analysis regarding the highlighted issues was performed. Review discovered that surfactants does affect material porosity and alumina templated with sucrose demonstrated high porosity. Alumina-sucrose templated with 491 m²/g surface area, 0.62 cm³/g pore volume, and 4.20 nm pore diameter is predicted to have better removal performance with removal of >83% oil and grease, >87.83% COD, and >86.6% BOD, compared to non-modified alumina. From review, surface modification with surfactant templated is proven improve material's morphology and performance.