

# REUSABLE PHOTOCATALYST MATERIAL BASED ON GLAGAH KULONPROGO BEACH IRON SAND FOR THE DEGRADATION OF METHYL ORANGE AND RHODAMINE B DYES IN TEXTILE WASTEWATER.

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## ABSTRACT

The purpose of this study is to examine the use of Fe<sub>3</sub>O<sub>4</sub>/GO nanocomposites to degrade methyl orange (MO) and rhodamine b (Rh-B) color waste and how it performs after more than once. This research will be carried out for 1 year. The addition of GO can indeed increase the photocatalyst activity quickly. However, the addition of too much GO can make the magnetic properties of the Fe<sub>3</sub>O<sub>4</sub>/GO composite not dominant. If this happens, it will be difficult to separate the photocatalyst material from the solution so that it cannot be reused. Therefore, the optimization of Fe<sub>3</sub>O<sub>4</sub>/GO composites is very important for the development of effective and reusable photocatalyst materials to improve environmental quality.

The results show that the large surface area and band gap energy are suitable for MO degradation under UV irradiation. Fe<sub>3</sub>O<sub>4</sub>/GO achieved a degradation rate toward MO of 99% after 240 min of exposure and could be separated from the final solution using an external magnetic field. Fe<sub>3</sub>O<sub>4</sub>/GO was also recycled for reuse three times with high degradation efficiency. The best degradation performance of Fe<sub>3</sub>O<sub>4</sub> against RhB was achieved with 0.1 gram Fe<sub>3</sub>O<sub>4</sub>/GO, which degraded RhB by 91% after 270 min of UV irradiation. Reuse of Fe<sub>3</sub>O<sub>4</sub>/GO was tested three times with effective degradation.

Kata Kunci: *Photocatalyst, Fe<sub>3</sub>O<sub>4</sub>/GO, methyl orange, rhodamine b, iron sand*