

Title : Development of photocatalyst hydrogel composite materials for wastewater treatment

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## ABSTRACT

Due to the issue of wastewater discharge from industrial plants, chemical methods have been developed to remove non-biodegradable organic substances. One such method involves the use of photocatalysts to degrade and break down the hydrocarbon bonds of dye solutions. This research focuses on developing photocatalyst-hydrogel composite materials, using zinc oxide (ZnO) as the primary photocatalyst. Comparisons were also made by combining ZnO with three other substances: activated carbon, titanium dioxide, and carbon nitride.

The photocatalyst-hydrogel composites were synthesized using photopolymerization, and their effectiveness was tested on the degradation of three dyes: methyl orange, methylene blue, and rhodamine B. Experimental results showed that the developed materials achieved the highest decolorization efficiency with methylene blue at 95%, followed by methyl orange at 79%, and rhodamine B at 24%. The materials are promising for practical applications due to their pellet-like form, which is suitable for use, and their low production cost.

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