

**OXIDATIVE DEGRADATION OF
CARBAMAZEPINE USING CaCuFeO_3
PEROVSKITE CATALYST**

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**BACHELOR OF CHEMICAL ENGINEERING
(ENVIRONMENT) WITH HONOURS**

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USING CaCuFeO_3 PEROVSKITE CATALYST**

By

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ABSTRACT

Perovskite oxides have attracted much attention due to their ability to efficiently oxidize and remove a variety of organic contaminants from wastewaters. The synthesis of CaCuFeO₃ perovskite catalysts was prepared using the combined EDTA-citric acid complexation method. The main objective of this research is to investigate the influence of partial Cu substitution in the calcium iron perovskite catalysts on the oxidative degradation of carbamazepine. The catalytic performance activity was carried out using the CaCuFeO₃ perovskite catalyst for the removal of carbamazepine (CBZ) using the oxidant H₂O₂ depending on the dosage of the catalyst in a batch process. The physico-chemical properties of resultant catalyst were characterized using nitrogen sorption analysis and FESEM-EDX analysis. The results show that the degradation of CBZ was found to be 50% after 90 minutes under the conditions of 10 mg/L CBZ, 44mM H₂O₂, 1 g/L CaCuFeO₃ and at room temperature. The optimal dosage of CaCuFeO₃ catalyst was 0.8 g/L because the reaction rate constant (k) tend to saturate at 1.1×10^{-3} L/mg.min, whereby at higher dosage insignificant change of kinetics was observed (1 g/L, 1.2×10^{-3} L/mg.min). This is due to the fact that the formation of hydroxyl radicals (\bullet OH) increases with the increase in catalyst dosage, as the number of active sites increases during catalysis. These results provide interesting insights into the feasibility of using CaCuFeO₃ perovskite catalysts for the degradation of recalcitrant micropollutants.