

SYNTHESIS AND CHARACTERIZATION OF CALCIUM-DOPED BaO HETEROGENEOUS NANOCATALYST FOR BIODIESEL PRODUCTION FROM WASTE COOKING OIL: KINETIC STUDIES

Biodiesel, a promising alternative to fossil fuels, is produced through transesterification of triglycerides (fats and oils) with an alcohol (typically methanol) using a catalyst. Waste cooking oil (WCO) serves as a readily available and inexpensive feedstock for biodiesel, but its utilization presents challenges due to the presence of free fatty acids (FFAs). Conventional homogeneous catalysts are effective but face drawbacks like separation difficulties, high production costs, and environmental concerns. Heterogeneous catalysts offer advantages like reusability, ease of separation, and the potential to handle FFAs. This research proposes the development of a novel calcium-doped BaO (barium oxide) heterogeneous nanocatalyst for efficient biodiesel production from WCO, alongside in-depth kinetic studies to understand the reaction mechanism.