

Utilization of MATLAB to Simulate Kinetics of Transesterification of Palm Oil-Based Methyl Esters with Trimethylolpropane for Biodegradable Synthetic Lubricant Synthesis

ABSTRACT

This paper presents the simulation work on kinetic study for the transesterification reaction between palm oil-based methyl ester with trimethylolpropane to produce biodegradable lubricant base oil. The reaction mechanism involves three stepwise reversible series-parallel elementary reactions. New kinetic modeling approach is needed in this field due to the limitation of the earlier kinetic models developed for this reaction. The earlier kinetic study made use of many assumptions in order to simplify the solutions. In this work, new rate equations were derived from the actual reaction mechanism, and MATLAB was used to obtain the simultaneous solutions of the rate equations. The results obtained were compared with the experimental data used in the earlier study. The new simulation approach was found to describe the experimental values satisfactorily.