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Kinetic Modeling of Transesterification of Triacetin Using Synthesized Ion Exchange Resin (SIERs)

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Abstract : Strong anion exchange resins with QN+OH-, have the potential to be developed and employed as heterogeneous catalyst for transesterification, as they are chemically stable to leaching of the functional group. Nine different SIERs (SIER1-9) with QN+OH- were prepared by suspension polymerization of vinylbenzyl chloride-divinylbenzene (VBC-DVB) copolymers in the presence of n-heptane (pore-forming agent). The amine group was successfully grafted into the polymeric resin beads through functionalization with trimethylamine. These SIERs are then used as a catalyst for the transesterification of triacetin with methanol. A set of differential equations that represents the Langmuir-Hinshelwood-Hougen-Watson (LHHW) and Eley-Rideal (ER) models for the transesterification reaction were developed. These kinetic models of LHHW and ER were fitted to the experimental data. Overall, the synthesized ion exchange resin-catalyzed reaction were well-described by the Eley-Rideal model compared to LHHW models, with sum of square error (SSE) of 0.742 and 0.996, respectively.

Keywords : anion exchange resin, Eley-Rideal, Langmuir-Hinshelwood-Hougen-Watson, transesterification
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