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Reaction kinetic study of triterpene hydrogenation using a heterogeneous catalyst

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This research focuses on reaction kinetic study of three-phase catalytic hydrogenation on a heterogeneous Ru/C catalyst.

The reaction mixture consisted of a triterpene diluted in a solvent. Dodecane was used as a suitable solvent to reduce an effect of reaction exothermicity and improve the dissolution of hydrogen in a liquid phase. The hydrogenation was conducted in a batch reactor equipped with a catalyst basket. The Ru/C catalyst was used in the form of cylindrical pellets. Sufficient mixing of the fluid was ensured with a gas induction stirrer with a hollow shaft.

The experiments consisted of several hours long isothermal runs with a regular sampling in about 20 min long intervals. Extensive set of experimental data was collected that includes the effect of temperature, stirring speed, hydrogen pressure on the catalytic activity of the catalyst.

The data served for the investigation of the kinetics and reaction mechanism that was described by the developed kinetic model. The kinetic model was experimentally validated and the kinetic parameters of the individual reaction steps were determined.

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