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Review

Dynamic methods for catalytic kinetics

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Abstract

The application of various transient techniques in heterogeneous catalysis (TAP, Step-Response Experiments, SSITKA, TEOM), with the aim to determine reaction kinetics for design purposes, is presented for several cases. These cases, comprising catalytic cracking, diffusion in zeolites, simultaneous NO_x and SO_x removal, syngas production from methane by chemical looping and selective catalytic reduction of NO_x, show that transient techniques can be well used for the purpose of rapid determination of the reaction kinetics without the laborious classical approach of steady-state kinetic measurements and without the need of high levels of sophistication to interpret and process the experimental data. In this respect transient kinetics deserve, next to fundamental catalysis studies, more frequent application in design studies for industrially relevant reaction systems. Topics and challenges for further developments in transient studies are indicated.

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