

Mathematical modeling of changes in the fractional composition of dehydrogenation catalysts in a fluidized-bed reactor

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Abstract

© 2015 Pleiades Publishing, Ltd. A mathematical model describing the destruction of catalyst particles during operation in an industrial fluidized-bed reactor with allowance for the crushing and abrasion of particles is proposed. Differences between the mechanical properties of IM-2201 and KDI catalysts used in the dehydrogenation of iso-butane to iso-butylene at PAO Nizhnekamskneftekhim are established. Using KDI catalyst with modification of the cyclone group and retention of the equilibrium distribution of particles according to size in a reactor is shown to provide a more than a 2.5-fold reduction in catalyst consumption.

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Keywords

abrasion, chromia-alumina catalyst, crushing, dehydrogenation, fractional composition, grain, mathematical modeling