

Selecting the conditions of molding iron oxide catalysts for dehydrogenation

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Abstract

The effect of the conditions for molding iron oxide catalysts for dehydrogenation of isoamylenes to isoprene on their operation characteristics was studied. The investigation of laboratory samples allowed us to determine the optimum molding pressure (200-250 MPa) under which high mechanical strength (strength factor $KG = 33.4-37.3$ N/mm), the stability of the kinetic characteristics in the dehydrogenation reaction, and the formation of 15-50 nm pores, ensuring the occurrence of the process in the kinetic region, were attained. we propose using the extrudate density as an indirect criterion for estimating the molding pressure under industrial conditions of extrusion. It was shown that in order to develop high strength properties ($KG \sim 29.1$ N/mm) of the catalysts upon their production under industrial conditions and to ensure the occurrence of the reaction in the kinetic region, the extrudate density must be 2.40-2.46 g/cm³. The obtained results were verified via paste molding on various industrial extruders, thereby enabling us to recommend the type of molding extrusion equipment. © Pleiades Publishing, Ltd., 2011.

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Keywords

Dehydrogenation, Extrudate, Extrusion, Pressure, Strength factor, Thiele modulus