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Influence of hydrothermal treatment conditions on the structure and catalytic activity of alumina during the skeletal isomerization of n-butenes

Lamberov A., Sitnikova E., Mukhambetov I., Zalyalieva R., Gil'mullinb R., Gilmanov K.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In order to obtain an efficient alumina catalyst for skeleton isomerization of n-butenes with a high catalytic activity, we study the influence of hydrothermal treatment (HTT) of alumina systems at 150- 200°C on the parameters of the crystalline and pore structure, and acid-base properties of industrial γ -Al₂O₃. It is shown that the HTT of aluminum hydroxide increases the sizes of microcrystallites and reduces the alumina's specific surface area and the number of acid-base centers. This reduces the activity in the reaction of skeletal isomerization of n-butenes. HTT of the two-phase alumina-aluminum hydroxide system produces smaller crystallites of γ -Al₂O₃ and raises the acidity of the alumina obtained after calcination at 550°C; as a result, the catalytic activity increases. This method can be used to enhance the activity of industrial samples of alumina in the reaction of skeletal isomerization of n-butenes. © Pleiades Publishing, Ltd., 2012.

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Keywords

Alumina, Butenes, Hydrothermal treatment, Skeletal isomerization