Heterogeneous Catalytic Condensation of Olefins in the Presence of Hydrogen, Using Oxygen as the Reaction Initiator

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Hydrogenation of pentene-1 by hydrogen over a cobalt/clay catalyst at a temperature of 100° results in its condensation to form C_6, C_7, C_8, C_9, and higher hydrocarbons. The yield of the condensed products is about 15%, based on the olefin charge. Addition of oxygen in amounts of 0.7–1.2% increases the product yield by the factor of 1.5–1.7; on the other hand, increasing the reaction temperature to 180°, decreases the yield by 50%.

Oxidation in Gas Phase of Partially Hydrogenated Derivatives of Benzene

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A study of oxidation of 4,5-dimethyl-1,2,3,6-tetrahydrophthalic anhydride, 1,2,4,5-tetramethylcyclohexane, 4-methyl-1,2,3,6-tetrahydrophthalic anhydride, and of 2,6-dimethyldecalin was carried out in the gaseous phase over a vanadium catalyst. The oxidation of 4,5-dimethyl-1,2,3,6-tetrahydrophthalic anhydride and of 1,2,4,5- tetramethylcyclohexane resulted in formation of pyromellitic anhydride in amounts of 35–45% and the oxidation of 2,6-dimethyldecalin produced up to 12% of phthalic anhydride. The processes investigated demonstrate that dehydrogenation of naphthenes and of partially hydrogenated aromatics—to form alkyl benzenes—occurs ahead of the oxidation reaction. A hypothesized mechanism is described for oxidation in the gaseous phase of the subject hydrocarbons.

Valence State of Chromium in Active Centers of a Potassia-Chromia-Alumina Dehydrogenation Catalyst

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The results of this study demonstrate that the active centers, responsible for chemisorption of hydrocarbons on a reduced potassia-chromia-alumina catalyst, contain Cr^{2+} ions.

Decomposition of Isopropyl Alcohol Over Titanium Dioxide With an Octahedral (Anatase) Structure

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Decomposition of isopropyl alcohol was investigated, using octahedral (anatase) TiO_2 and the TiO_2 + 0.5 mol % WO_3 catalysts. The added WO_3 has substantially no effect on catalytic properties of octahedral TiO_2. The experimentally-determined catalytic activities, electroconductance, and the electron work function values of the two catalysts are compared with the like performance characteristics of another set of two catalysts of identical composition but using the TiO_2 component with rutile structure.

Chemisorption of Nitrogen on Precipitated Iron Catalysts Used in Ammonia Synthesis

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Chemisorption of nitrogen was studied at a temperature of 475° on the precipitated iron catalysts promoted with Al_2O_3 (1–37.5% by wt), K_2O (~2%, by wt), and by $Al_2O_3 + K_2O$. The unpromoted iron catalyst is used in commercial production of ammonia.

Addition of individual promoters —particularly, of K_2O— to the precipitated iron catalyst increases its capacity to chemisorb nitrogen; on the other hand, simultaneous addition of the two promoters results in co-inhibition of their individual ability to promote the chemisorption.

The fused and precipitated iron catalysts with near-identical compositions have similar capacities for chemisorption of nitrogen.

Certain discrepancy was found to exist between capacity of the promoted iron catalysts to chemisorb nitrogen and their catalytic activities in the ammonia synthesis at atmospheric pressure.

Phase Analysis of Ferric Oxide-Molybdena Catalysts

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The results show that a 0.3 *M* solution of hydrazine in hydrochloric acid selectively dis-