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The role of oxide catalysts in processing of hydrocarbon raw materials to commercial products

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As we know, the most of chemical products produced by industry are manufactured by catalytic methods in presence of catalysts. A wide variety of applicable catalysts have a special role to be used as oxide catalysts. In this report examined low-percentage catalysts on based of transition metal oxides for processes – Dry Reforming (DRM) and Partial Oxidation of Methane (POM) to synthesis gas, the conversion of bioethanol to ethylene and air purification from impurities o-xylene. The investigation of DRM on NiCuNdMo/Al_2O_3HZSM-5 catalyst is shown at the optimal process condition: CO_2/CH_{4-1}, T-850 °C, W-3600 h^{-1}, concentration of hydrogen-48.9 vol.%, carbon monoxide 50.9 vol.% in the reaction products, conversion of methane-92.6% and carbon dioxide-93.2%. In the process of POM on 5% NiLa/ γ-Al_2O_3 catalysts at 750^0C obtained synthesis gas with selectivity of H_2=43 and CO=73% were used. The catalysts 6% CeLa/γ-Al_2O_3 was developed for conversion of bioethanol. At 400°C and W=6000 h^{-1}, the concentration of ethylene in the products increase to 98 vol.%, conversion of ethanol 100%. The 7% CuMnCe/γ-Al_2O_3 catalyst was developed for purification of the waste gas from O-xylene. At 300°C, concentration of O-xylene=0.6 g/m^3 and W=3000 h^{-1}, conversion of O-xylene increased to100%. The investigation of catalysts by physical-chemical methods are shown that the modified of oxide catalyst of rare earth elements come to increasing dispersity and formation of nanosize active phase (2-5 nm), which increase its activity, also stability of catalysts to coke formation.

Biography

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Notes:

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