STUDY THE REACTION OF OXIDIZING CONDENSATION OF METHANE

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For the last years the attention of researchers is attracted by the reaction of oxidizing condensation of methane, allowing in one-stage process to obtain C2-hydrocarbons and first of all ethylene from natural gas and air that opens wide prospect of replacement of petroleum raw material on natural gas.

The efficiency of the decision of similar problems first of all depends on selection of active catalysts, which have high selectivity and productivity.

The experiments have been carried out on flowing type device with a stationary layer of the catalyst at atmospheric pressure. Investigated oxide catalysts put onto keramzit study standard conditions, described by the following parameters; the reaction temperature 750° C; volume ratio of methane : air is 1:2; the size of volume speed 1200 hour⁻¹. The highest ethylene output is obtained on the catalyst with the composition of Mn₂O₃+KCl+ZrO₂.

For the development of the investigated bases of ethylene synthesis by the reaction of oxidizing condensation of methane the kinetic law was investigated changing partial pressure of methane and oxygen. The experiments have been carried out in an interval of temperatures 700-800°C and specific volume speed 600-1200 hours⁻¹ in rather large value of linear speed of gas mixtures (31.5 cm/sec), which provides the course of the reaction in kinetic area.

It was revealed, that with increase of partial pressure of methane and oxygen in investigated interval of parameters the output of final product - ethylene is increased. The selectivity of the process on ethylene carries extreme character from size of specific volume speed. The common conversion of methane is increased with the reduction of size of volume speed.

On the basis of revealed kinetic laws the stage scheme of the reaction of oxidizing condensation of methane with the oxygen of air, foreseeing the heterogen-homogeneous scheme with the participation of oxygen and chlorine of crystal lattice of the developed catalyst was offered.