



**Scientific Program of the
XXII International conference on Chemical Reactors
CHEMREACTOR-22**

London, United Kingdom, September 19-23, 2016

EFCE Event 736

**Boreskov Institute of Catalysis of the Siberian Branch
of the Russian Academy of Sciences, Novosibirsk, Russia**

University College London, United Kingdom

European Federation on Chemical Engineering

**Scientific Council on Theoretical Fundamentals of Chemical
Technology RAS Scientific Council on Catalysis RAS**

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**Conference Proceedings:
CHEMICAL ENGINEERING JOURNAL (*Elsevier*)
CHEMICAL & ENGINEERING PROCESSING:
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Conversion of Light Alkanes into Oxygenates

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Results of research the activity of polyoxide catalysts containing 1, 5 and 10% MoCrGa supported on natural carrier white clay (TWC) into oxidative conversion of propane-butane mixture into oxygenates are presented. The activity of developed catalysts (1% MoCrGa/TWC, 5% MoCrGa/TWC and 10% MoCrGa/TWC) in oxidation of reaction mixture to acetaldehyde, acetone and methyl ethyl ketone was investigated by varying the temperature from 673 to 823K and ratio of C₃-C₄ : O₂ : N₂ : Ar = 5 : 1 : 4 : 5; $\tau = 8$ s and GHSV = 450 h⁻¹. Studies have been done on a flow-type installation at atmospheric pressure in quartz tubular reactor with fixed catalyst bed. Analysis of initial substances and reaction products was carried out using chromatographic method on «Agilent Technologies 6890N».

Acetaldehyde was not formed on the 1% MoCrGa/TWC catalyst in the investigated temperature range. However, 33% acetaldehyde is formed on the 5% MoCrGa/TWC catalyst at 673K, the number of which gradually decreases with increasing of reaction temperature up to 12%. 36.5% acetaldehyde is formed on the 10% MoCrGa/TWC catalyst at 673K. The formation of acetaldehyde reached 40% while increasing the temperature to 723K, and reduced to 33% with a further increase in temperature.

Thus, 5% and 10% MoCrGa/TWC catalysts are optimal for the formation of acetaldehyde, on which is formed of 33% and 36.5% acetaldehyde at 673K, respectively.

Change in activity of studied catalysts by the formation of acetone was determined. Yield of acetone at all temperatures also does not observe on 1% MoCrGa/TWC catalyst. However, 33% acetone is formed on 5% MoCrGa/TWC catalyst at 673K, the amount of which increased to 50.9% with the growth of

temperature. 37% acetone is formed on 10% MoCrGa/TWC catalyst at 673K, but the number of acetone is reduced to a minimum with increasing temperature up to 823K.

Thus, the 5% MoCrGa/TWC is the optimal catalyst, on which the yield of acetone increased to 50.9% at 673-823K.

It was found that methyl ethyl ketone (MEK) is not formed on the 1% MoCrGa/TWC catalyst in reaction mixture. However, 20% MEK is formed on 5% MoCrGa/TWC catalyst at 673K, the amount of which increased to 38% with the growth of temperature. 15% MEK is formed on the 10% MoCrGa/TWC catalyst at 673K, but an inverse relationship in the formation of MEK is observed with increasing temperature up to 823K, the amount of which is reduced.

Thus, 5% MoCrGa/TWC catalyst is optimum for obtaining of 38% MEK, 50.9% acetone and 33% acetaldehyde.

Developed active catalysts can be the basis for the creation of a pilot utilization process of C₃-C₄ hydrocarbons and production of oxygenates.

Acknowledgements. This work was supported by the Ministry of Education and Science of the Republic of Kazakhstan, grant 0330/GF4.