**production OF Synthesis gas and its conversion into liquid hydrocarbons**

**Dossumov K.a, b, Ergazieva G.E.a, Ermagambet B.T.c, Mironenko A.V.a, Telbayeva M.M.a, Myltykbayeva L.K.b, Kassenova Zh.Mc.**

*aInstitute of Combustion Problems, Almaty, Kazakhstan, e-mail: ergazieva\_g@mail.ru*

*bal-Farabi Kazakh National University, Centre of Physical and Chemical Methods of Investigation and Analysis, Almaty, Kazakhstan*

*cLLP Institute Chemistry of Coal and Technology*

Synthesis gas (CO–H2 mixture) is an alternative source of raw materials for the petrochemical industry.1 The main areas of use of synthesis gas oxosynthesis, reduction of iron ore in metallurgy, Fischer-Tropsch synthesis etc. Partial oxidation (POM) and dry reforming of methane (DRM) have a number of advantages over the currently available synthesis gas production processes based on steam reforming of CH4. DRM is of particular interest because it allows you to simultaneously dispose of two greenhouse gases – CH4 and CO2.2

In this work, the influence of the method of preparing catalysts on the direction of DRM to synthesis gas were studied. The transformation of synthesis gas into liquid hydrocarbons on cobalt catalysts also was investigated.

It has been shown that the preparation of Co2O3/Al2O3 by the “solution combustion” method increases its efficiency in the conversion of CH4 and CO2 by increasing the dispersion of the catalyst. Under the DRM reaction conditions: CH4:CO2 = 1:1, GHSV = 1500 h-1, T= 700°C on a 15% Co2O3/Al2O3, synthesized by “solution combustion” method, XCH4 = 95 %, XCO2 = 98 %, H2 / CO = 1.1.

Conversion of synthesis gas to liquid hydrocarbons on the cobalt containing catalyst was studied. Catalyst was prepared by impregnation and “solution combustion” methods. Synthesis of a cobalt catalyst by "solution combustion" increases its dispersity, in the catalyst composition the nanophases with sizes of 10-50 nm are observed. When a H2/CO = 2/1 mixture is converted on a cobalt-containing catalyst with REE additives prepared using the “solution combustion” method, at T= 300 °C and P= 6 atm, methanol, ethanol and dimethyl ether are formed as liquid products (10-15 vol.%).

The data obtained can be used in the development of new promising catalysts for the direct production of liquid hydrocarbons from methane through synthesis gas.

***References***

1. Davood Iranshahi, Reza Saeedi, Kolsoom Azizi. *Fuel* 2017, **190**, 386.

2. [Dossumov K.](https://www.scopus.com/authid/detail.uri?origin=AuthorProfile&amp;authorId=16457684200&amp;zone), Ergazieva G., [Myltykbayeva](https://www.scopus.com/authid/detail.uri?origin=AuthorProfile&amp;authorId=56770171400&amp;zone) [L.K.,](https://www.scopus.com/authid/detail.uri?origin=AuthorProfile&amp;authorId=56770171400&amp;zone) [Telbayeva M.M.](https://www.scopus.com/authid/detail.uri?origin=AuthorProfile&amp;authorId=57192933182&amp;zone) [*Eurasian Chemico-Technological Journal*](https://www.scopus.com/sourceid/7200153124?origin=resultslist) 2018, **20(2)**, 131.

This work was supported by the Ministry of Education and Science of the Republic of Kazakhstan, grants № AP05132114 and № **BR05236359.**