**A study of ethanol dehydrogenation to acetaldehyde over copper-containing catalysts**

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In recent times, in the global chemical industry is becoming increasingly important environmental problems. The solution of which can be implemented through the creation of new, alternative industries, characterized by a minimum amount of hazardous waste and based on renewable sources of raw materials. In recent times, against the background of stricter requirements for environmental technologies and the desire to get rid of oil dependence, interest in the process of synthesis of acetaldehyde by of ethanol dehydrogenation increases again.1 In addition, it is worth noting the importance and value of hydrogen produced in the process of catalytic dehydrogenation of ethanol along with acetaldehyde. Method of obtaining acetaldehyde dehydrogenation of ethanol has several advantages: no toxic waste, sufficiently mild conditions of reaction and obtaining acetaldehyde together with hydrogen, which can be used in other processes. The raw material can serve as bioethanol derivable from biomass. Rapidly developing biotechnology already allows the production of bioethanol from organic waste, which leads to a decrease in the cost of bioethanol and the gradual abandonment of the use of petroleum raw materials. However, to create a competitive technology for producing of acetaldehyde from bioethanol, of necessary development an effective catalyst.2 An important step for creating high-performance catalysts is the search for the carrier, additives and modifying the method of preparing the catalyst, which affects their structure and catalytic properties

The purpose of this work was to investigate ethanol dehydrogenation into acetaldehyde using copper-containing catalysts supported on Al2O3. The catalysts, prepared by solution combustion or incipient wetness method. The catalysts were characterized by using various physico-chemical methods, such as TEM, XRD and XPS. The results revealed that the multicomponent catalysts (CuO-Cr2O3/Al2O3) exhibited superior activity compared to the metal oxide catalysts containing only one metal oxide (CuO/Al2O3, Cr2O3/Al2O3). In addition, the most selective catalyst towards acetaldehyde formation, with 50% selectivity at 55% conversion of ethanol at 300oC and WHSV = 1 h-1 was CuO-Cr2O3/Al2O3 prepared by using the solution combustion method.

***References***

1. Ishtvan Boldog, Pavel Čičmanec, Yadolah Ganjkhanlou, Roman Bulánek. *Catalysis Today* 2018, **304**, 64.

2. S.Tayrabekova, P. Mäki-Arvela, M. Peurla, P. Paturi, K. Eränen, G. Ergazieva, A. Aho, D. Yu.Murzin, K. Dosumov. [*Comptes Rendus Chimie*](https://www.scopus.com/sourceid/22183?origin=resultslist) 2018, **21(3-4)**, 194.