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HOMOGENEOUS PYROLYSIS OF DIMETHYL ETHER UNDER PULSED ADIABATIC COMPRESSION

I. V. Bilera and S. N. Khadzhiev

A. V. Topchiev Institute of Petrochemical Synthesis, Russian Academy of Sciences, 29 Leninsky Prosp., Moscow 119991, Russian Federation

Abstract: Thermal decomposition of dimethyl ether (DME) has been studied in a rapid compression machine over a temperature range 1060–1920 K. The main products (H\textsubscript{2}, CO, CH\textsubscript{4}, and formaldehyde) and minor products of reaction have been identified. Some of them like propane, propene, allene, methylacetylene, butadiene-1,3, vinylacetylene, diacetylene, cyclopentadiene, benzene and toluene were identified for the first time. It is shown that ethylene yield remains constant in the temperature range 1700–1920 K at the conversion degree of DME exceeding 95% along with the decrease of methane and ethane yields and the increase of acetylene yield.

Keywords: dimethyl ether (DME); pyrolysis; rapid compression machine (RCM); formaldehyde; ethylene

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References


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Contributors

Bilera Igor V. (b. 1968) — Candidate of Science in chemistry, leading research scientist, A. V. Topchiev Institute of Petrochemical Synthesis, Russian Academy of Sciences, 29 Leninsky Prosp., Moscow 119991, Russian Federation; bilera@ips.ac.ru

Khadzhiev Salambek N. (b. 1941) — Academician of the Russian Academy of Sciences, Doctor of Science in chemistry, professor, scientific head, head of laboratory, A. V. Topchiev Institute of Petrochemical Synthesis, Russian Academy of Sciences, 29 Leninsky Prosp., Moscow 119991, Russian Federation; khadzhiev@ips.ac.ru