Two-stage pressurized pyrolytic conversion of biomass into synthesis gas

Faleeva Y.M.[1] **and Lavrenov V.A.**[1,@]

[1] Joint Institute for High Temperatures of the Russian Academy of Sciences, Izhorskaya 13 Bldg 2, Moscow, 125412, Russia

[@] v.a.lavrenov@gmail.com

Plant biomass is a renewable resource that can be thermally converted first into synthesis gas and then into a range of valuable liquid chemical products. One promising method is two-stage pyrolytic conversion, which combines slow pyrolysis and subsequent high-temperature cracking of volatiles in a layer of solid coal residue. Carrying out the process under excess pressure above 3 MPa offers a number of advantages: reduction in reactors size, reduction in energy losses, simplified scalability, and the production of already compressed gas. Laboratory studies of the process of two-stage pyrolysis of wood were carried out at pressures from atmospheric to 4 MPa with a step of 0.5 MPa. The results obtained show changes in the main process parameters: specific yield of synthesis gas, component composition, content of impurities, moisture and tars. The results confirm the method's high efficiency.