



OPTIMIZATION OF THERMAL DECOMPOSITION PROCESS OF BIOMASS PYROLYSIS TARS FOR THE PRODUCTION OF HIGH CALORIFIC GASES

K. Zakarauskas, N. Striūgas, G. Stravinskas

*Lithuanian Energy Institute
Breslaujos g. 3, LT-44403 Kaunas – Lithuania*

ABSTRACT

Biomass and bio-waste gasification is one of alternatives in heat and electricity generation, by developing local renewable energy sources. This technology has not been worked out fully, therefore, a lot of problems are faced that prevent from mass spread of gasification technologies in industry. One of aforementioned problems is the presence of tar in gasification gas. The permissible tar concentration in gasification gas is from 0 to 500 mg/m³, depending on where it is intended to use the obtained gas (e.g., in case of gas turbines, it is allowed only up to 5 mg/m³). Seeking to optimize the gasification processes, new methods for tar removal from gas are looked for. One of them is catalytic reforming, when hydrocarbons, comprising the tar, are additionally gasified till end products of reaction.

The article presents the results of research on catalytic reforming of thermal decomposition of tar, obtained during biomass gasification and present in the composition of gas. For research the catalyst of activated char of tires was used at two thermochemical processes: partial oxidation and steam reforming. What is more, the change of composition of gas-tar mix during tar decomposition was assessed, their mass balance before and after thermal decomposition was formed. Furthermore, the influence of these processes on common calorific value of gas under different conditions, as well as at different temperatures, different time in catalyst, at different steam and/or air quantity, was identified. It must be noted that the analysis of obtained results was performed, they were compared with results of other authors. Thus, the generalization of all results will allow defining optimum parameters at which the purification of gasification gas from tar is most effective and gas output is the best.

Keywords: Biomass gasification, tars, steam reforming, partial oxidation, char