ABSTRACT

In this thesis a three-years work is described. In the introduction section the general background of the situation is presented: (i) description of chemical reactions occuring in the process, (ii) the main gasifier designs and (iii) the Slovenian legislation regarding the emissions and the fuels. In experimental section all of the experimental work is explained, from TGA experiments to the experiments on 700 kW Bosio plant. The three mathematical models are presented in the next section. In them the equilibrium requirements are taken into account, as well as possible methanol synthesis.

In the »Results and discussion« section all the aforementioned is joined and discussed. The main goal of the work was to assess the possibility of using plastics as fuel for gasification. A quality of product gas was of interest since it is a prerequisite for a production of chemicals (methanol). The kinetics studies (based on TGA) showed that the plastics decomposition is much faster than that of wood/PE mixtures. For the evaluation of plastics gasification in practice the DFB pilot plant at Vienna University of Technology was used. The successful experiments showed that the plastics can be gasified, but better results are achieved when it is co-gasified with wood pellets. The best results were achieved with feedstock, in which plastics represented 75 % of energy input.