

COLD FLOW MODELLING OF DUAL FLUIDISED BED PYROLYSIS

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High temperature pyrolysis at about 600-700°C of carbon containing waste materials (plastic waste, shredded old tires, biogenic residues, etc.) is an attractive technology for substitution of fossil fuels in industrial processes. A dual fluidized bed system is investigated in a scaled cold flow model. This model consists of a riser as combustion section and a bubbling fluidized bed as pyrolysis section. The pyrolysis section is aimed to convert the solid feed material into pyrolysis oil as well as permanent gas components. This gas stream can be directly used e.g. in rotary kilns at temperatures of 400-600°C with high tar content and therefore high heating value. The char is transported with the bed material to the riser to provide the energy for the pyrolysis, transported via the hot bed material. Moreover, the pyrolysing section will be used to separate unconvertible materials such as metal pieces, stones, etc. from the process. For certain feed materials the pyrolysing section could be built as circulating fluidized bed to perform a classification of the feed material. Thus different residence time in the pyrolyser can be achieved, depending on the fuel particle size and fluidization.

The results are displayed inside a regime map of gas-solid fluidized beds. Bed material residence times as well as residence times of model particles of the feedstock are given. The investigations lead to a design of a system to be applicable for various feedstock materials as input for industrial processes.