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Introduction

- A project is carried out to develop a new process for tar removal downstream of a gasifier making use of biomass char as catalyst.
- In the first stage of the project biomass char was compared with other low cost catalysts.
- In the second stage of the project, fixed and fluidized bed experiments have been carried out to characterize biomass char as a catalyst using model tar components and real tar from a biomass gasifier.
- The third stage focuses on modeling and design of a process for tar elimination using biomass char.

Experimental setup

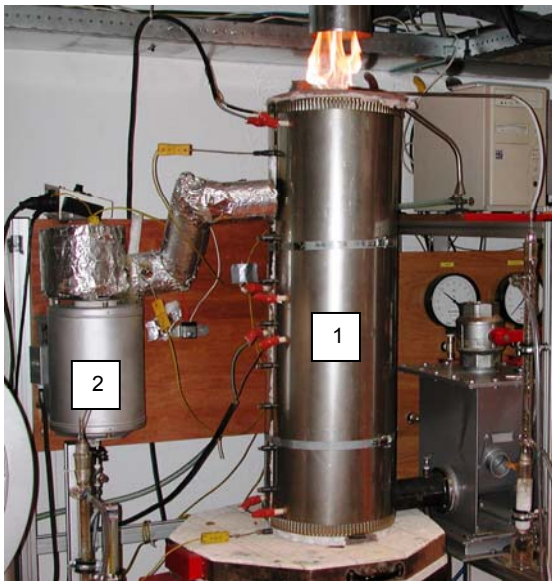


Figure1. Tar reduction experimental Setup. (1) Bubbling fluidized bed biomass gasifier, (2) fixed bed tar reduction reactor

Results

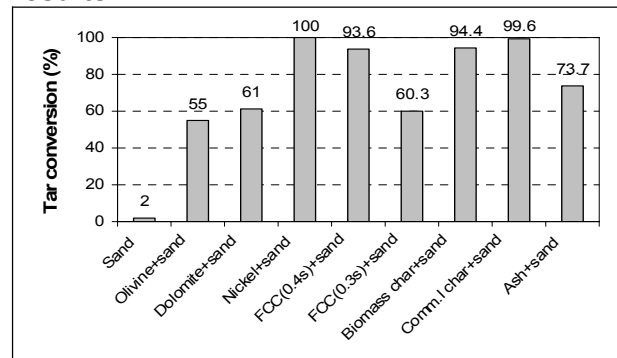


Fig.1 Effect of bed material on Naphthalene conversion, T=900 °C, t=0.3-0.4 s

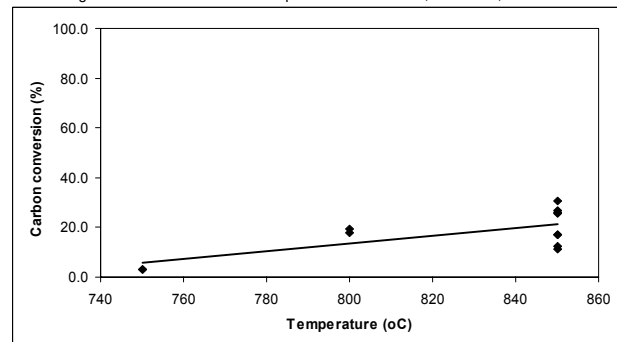


Fig.2 Effect of tar cracker temperature on conversion of the carbon content of the char bed (gas res. time=0.3 s, particle size 500-600 µm, time on stream 1 h)

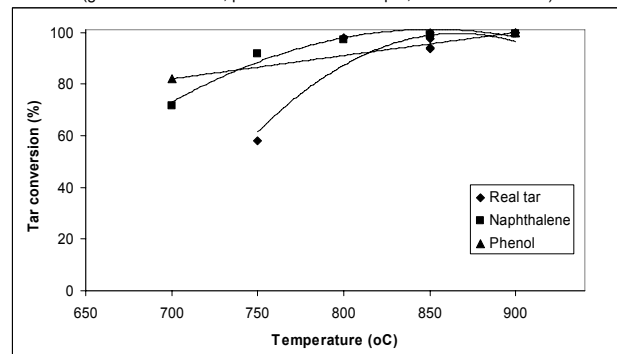


Fig.3 Effect of tar cracker temperature on real tar conversion, (gas res. time=0.3 s, particle size 500-600 µm)

Conclusions

Biomass char is highly active catalyst for producer gas tar removal in the temperature range 800-850 °C. However, char consumption should be taken into account.