Residual Char from Gasification Integrated in a Tar Removal System

The Low Temperature-Circulating Fluidized Bed (LT-CFB) gasifier is a staged process, designed for conversion of straw and other ash-rich feedstock. The main drawback of this technology is the severe tar load in the producer gas, which limits the downstream applications to direct combustion. In this work, a reactor has been tested to clean and upgrade the LT-CFB producer gas by using residual gasification char. The char is a by-product of wood chips gasification in a 100kWth TwoStage gasifier (known as “Viking”). The test reactor was designed to investigate the effect of a char bed on the quality of producer gas, with and without addition of sub-stoichiometric air above the bed. The reactor was connected to the gas outlet of a 100kWth LT-CFB gasifier and maintained at 800°C with electric heating. The quality of the gas has been evaluated in detail before and after the cleaning step, by monitoring changes in the gas composition and tar concentration. Results from Test A (with air injection) and Test B (without air injection) showed that the reactor is able to efficiently remove tars. The effect of partial oxidation improved the stability of the gas cleaning step. These preliminary tests demonstrated the effectiveness of this solution to upgrade LT-CFB producer gas.

General information
Publication status: Published
Organisations: Department of Chemical and Biochemical Engineering, CHEC Research Centre
Contributors: Ravenni, G., Sárossy, Z., Ahrenfeldt, J., Henriksen, U. B.
Pages: 546 - 549
Publication date: 2018

Host publication information
Title of host publication: Proceedings of 26th European Biomass Conference and Exhibition
Publisher: ETA-Florence Renewable Energies
Keywords: Gasification, Straw, Gas cleaning, Tar removal, Biochar, Innovative concepts
DOIs:
10.5071/26thEUBCE2018-2BO.14.5
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2018 › Research › peer-review