

Effect of fast pyrolysis conditions on biomass solid residues at high temperatures - DTU Orbit (08/11/2017)

Effect of fast pyrolysis conditions on biomass solid residues at high temperatures

Fast pyrolysis of wood and straw was conducted in a drop tube furnace (DTF) and compared with corresponding data from a wire mesh reactor (WMR) to study the influence of temperature (1000-1400)°C, biomass origin (pinewood, beechwood, wheat straw, alfalfa straw), and heating rate (103 °C/s, 104 °C/s) on the char yield and morphology. Scanning electron microscopy (SEM), elemental analysis, and ash compositional analysis were applied to characterize the effect of operational conditions on the solid residues (char, soot) and gaseous products. The char yield from fast pyrolysis in the DTF setup was 3 to 7% (daf) points lower than in the WMR. During fast pyrolysis pinewood underwent drastic morphological transformations, whereas beechwood and straw samples retained the original porous structure of the parental fuel with slight melting on the surface. The particle size of Danish wheat straw char decreased in its half-width with respect to the parental fuel, whereas the alfalfa straw char particle size remained unaltered at higher temperatures. Soot particles in a range from 60 to 300 nm were obtained during fast pyrolysis. The soot yield from herbaceous fuels was lower than from wood samples, possibly due to differences in the content of lignin and resin acids.

General information

State: Published

Organisations: Department of Chemical and Biochemical Engineering, CHEC Research Centre, Lulea University of Technology

Authors: Trubetskaya, A. (Intern), Jensen, P. A. (Intern), Jensen, A. D. (Intern), Garcia Llamas, A. D. (Ekstern), Umeki, K. (Ekstern), Glarborg, P. (Intern)

Pages: 118-129

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: Fuel Processing Technology

Volume: 143

ISSN (Print): 0378-3820

Ratings:

BFI (2017): BFI-level 2

Web of Science (2017): Indexed Yes

BFI (2016): BFI-level 2

Scopus rating (2016): CiteScore 4.15 SJR 1.416 SNIP 1.722

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 2

Scopus rating (2015): SJR 1.519 SNIP 1.822 CiteScore 4.09

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 2

Scopus rating (2014): SJR 1.629 SNIP 2.161 CiteScore 3.96

BFI (2013): BFI-level 2

Scopus rating (2013): SJR 1.636 SNIP 2.142 CiteScore 3.83

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 2

Scopus rating (2012): SJR 1.682 SNIP 2.075 CiteScore 3.77

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 2

Scopus rating (2011): SJR 1.575 SNIP 1.773 CiteScore 3.38

ISI indexed (2011): ISI indexed yes

BFI (2010): BFI-level 2

Scopus rating (2010): SJR 1.629 SNIP 1.88

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 2

Scopus rating (2009): SJR 1.545 SNIP 1.856

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 1

Scopus rating (2008): SJR 1.471 SNIP 1.718

Web of Science (2008): Indexed yes

Scopus rating (2007): SJR 1.226 SNIP 1.654

Web of Science (2007): Indexed yes

Scopus rating (2006): SJR 0.986 SNIP 1.404

Scopus rating (2005): SJR 0.751 SNIP 1.143

Web of Science (2005): Indexed yes

Scopus rating (2004): SJR 0.82 SNIP 1.142

Scopus rating (2003): SJR 0.941 SNIP 1.134

Scopus rating (2002): SJR 0.731 SNIP 1.12

Scopus rating (2001): SJR 0.611 SNIP 0.992

Scopus rating (2000): SJR 0.429 SNIP 0.967

Web of Science (2000): Indexed yes

Scopus rating (1999): SJR 1.231 SNIP 1.026

Original language: English

CAMSIZER XT, Drop tube furnace, Fast pyrolysis, Soot, Wire mesh reactor

DOIs:

10.1016/j.fuproc.2015.11.002

Source: FindIt

Source-ID: 2289590226

Publication: Research - peer-review › Journal article – Annual report year: 2016