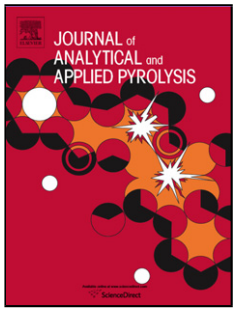

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PII: S0165-2370(17)31103-8
DOI: https://doi.org/10.1016/j.jaap.2018.04.007
Reference: JAAP 4306

To appear in: *J. Anal. Appl. Pyrolysis*

Received date: 19-12-2017
Revised date: 1-4-2018
Accepted date: 10-4-2018

Please cite this article as: Jun Shen, Jiaxun Liu, Yanfeng Xing, Hai Zhang, Lei Luo, Xiumin Jiang, Application of TG-FTIR analysis to superfine pulverized coal, Journal of Analytical and Applied Pyrolysis https://doi.org/10.1016/j.jaap.2018.04.007

Application of TG-FTIR analysis to superfine pulverized coal

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Highlights

- Superfine pulverized coal owns the advantage to reduce the CO_2 emission.
- Coal of lower rank releases greater amount of CO_2.
- CO yield for coal of lower rank is much higher than coal of higher rank.
- Yield trend of C=O group is similar to that of C=C group.
- H_2O evolution of superfine pulverized coal is the highest among all the particles.

Abstract

Thermogravimetric test combined with FTIR analysis is conducted to reveal the yield profile of gaseous species and functional groups, both for conventional and superfine pulverized coal (average particle size below or around 20μm). Generally speaking, the yield of CO_2 is less for superfine pulverized coal particle compared with conventional particle size. Since the content of carbonyl group is reduced, the amount of CO_2 released during the pyrolysis is more for coal of lower rank (i.e. Neimenggu bituminous coal). CO yield of Neimenggu coal is greater than Shenhua coal, because more side chains and hydroxyl groups are owned by coal of lower rank (i.e. Neimenggu bituminous coal). As C=O group is likely to be linked to the same compound as C=C group, the profile of C=O group is similar to C=C group. H_2O evolution of superfine pulverized coal is higher than conventional particle size, for the impact of mechanochemical force for finer particle may be more prominent. With the decrease of the coal particle size, yield trend of CH_4 gradually decreases, indicating that superfine pulverized coal is possibly engaged in NO reduction at the early stage of pyrolysis.

Keywords: Coal pyrolysis; Superfine pulverized coal; Thermogravimetric test; FTIR analysis.

1. Introduction

Coal pyrolysis is the chemical decomposition process where coal is heated at high

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