

LA DISTRIBUTION DES PRODUITS ET LA VALORISATION DES DECHETS AGRICOLES A TRAVERS LA PYROLYSE SOLAIRE

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Abstract

Pyrolysis is one of the most attractive process to convert biomass to bio-gas, bio-oil and bio-char. Utilization of concentrated solar energy as a heat source for the pyrolysis reactions increases the energy conversion efficiency and reduces the pollution discharge.

In this study, solar pyrolysis of different types of agricultural biomass (grape stalk, grape marc, pine sawdust and peach pit) has been conducted in a lab-scale solar reactor. The effects of final temperature, heating rate and feedstock variety on product distribution are investigated. Powders of biomass were compressed to cylinders with 10mm diameter and 5mm height for the experiments. The studied experimental parameters are: reaction temperature from 800°C to 2000°C, heating rate from 10°C/s to 150°C/s with a constant sweep gas flow rate of 6NL/min.

The experimental results show the same tendency of product distribution versus final temperature and heating rate with varieties of biomass. The gas yield generally increases with the temperature and heating rate. The maximal gas yield was 63.5wt% obtained with pine sawdust at 2000°C and 50°C/s.

Besides, the gas product compositions for different types of biomass are different. For example, the H_2/CO ratios versus final temperatures are totally different as shown in Fig1. The pyrolysis characteristics of different kinds of biomass can be explained with their chemical properties (composition and constituents). The energy upgrade efficiencies from different types of biomass are also reported in this study.

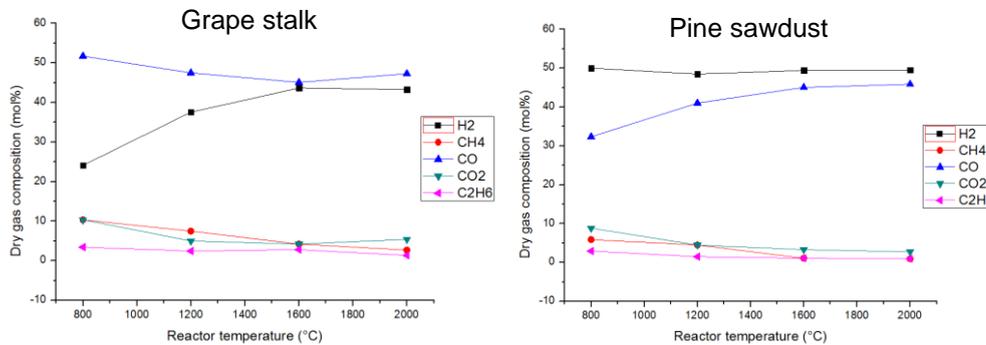


Figure 1. Dry gas compositions of pyrolysis gas product from different biomass with heating rate of 50°C/s.

Mots Clés : 'solar fuels', biomasse, pyrolyse solaire, stockage, syngaz