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Yaning Zhang, Yijun Zhao, Xiaoyan Gao, Bingxi Li, Jingqi Huang



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1           **Energy and exergy analyses of syngas produced from rice husk gasification**  
2                                   **in an entrained flow reactor**

3           Yaning Zhang<sup>1,2\*</sup>, Yijun Zhao<sup>1</sup>, Xiaoyan Gao<sup>1</sup>, Bingxi Li<sup>1†</sup>, Jingqi Huang<sup>1</sup>

4           <sup>1</sup>School of Energy Science and Engineering, Harbin Institute of Technology, Harbin, China

5           <sup>2</sup>School of Chemical Engineering and Technology, Harbin Institute of Technology, Harbin, China

6                                   **ABSTRACT**

7           Energy and exergy can be used to evaluate energy sources. The detailed energy and exergy of  
8           syngas produced from rice husk gasification in an entrained flow reactor were investigated at  
9           various reactor temperatures and equivalence ratios. The results showed that the exergy values of  
10          syngas were lower than their energy values and they followed well with the energy values.  
11          However, the detailed energy and exergy distributions of syngas were different at various reactor  
12          temperatures and equivalence ratios. This indicates that the contributions of gas components to  
13          the energy and exergy of syngas are different from gas to gas. Energy and exergy analyses  
14          therefore should be conducted appropriately according to evaluation purposes. The results also  
15          showed that the highest energy and exergy of syngas were achieved about 10062 and 7990 kJ per  
16          kg of fuel at the reactor temperature of 1000 degree Celsius and equivalence ratio of 0.25,  
17          respectively. The results obtained from this study can help understand the energy and exergy of  
18          syngas produced from biomass gasification as well as thermochemical conversion processes of  
19          biomass fuels.

20          **Keywords:** energy; exergy; syngas; gasification; entrained flow reactor; rice husk

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\*Corresponding author. Tel.: +86 451 86412078; fax: +86 451 86412078.

E-mail addresses: ynzhang@hit.edu.cn (Y. Zhang), libx@hit.edu.cn (B. Li).

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