Accepted Manuscript

Soot formation characteristics of ethylene premixed burner-stabilized stagnation flame with dimethyl ether addition

Yinhu Kang, Yuming Sun, Xiaofeng Lu, Xiaolong Gou, Sicong Sun, Jin Yan, Yangfan Song, Pengyuan Zhang, Quanhai Wang, Xuanyu Ji

| PII: | S0360-5442(18)30423-7 |
|----------------|------------------------------|
| DOI: | 10.1016/j.energy.2018.03.025 |
| Reference: | EGY 12483 |
| To appear in: | Energy |
| Received Date: | 02 September 2017 |
| Revised Date: | 07 February 2018 |
| Accepted Date: | 04 March 2018 |

Please cite this article as: Yinhu Kang, Yuming Sun, Xiaofeng Lu, Xiaolong Gou, Sicong Sun, Jin Yan, Yangfan Song, Pengyuan Zhang, Quanhai Wang, Xuanyu Ji, Soot formation characteristics of ethylene premixed burner-stabilized stagnation flame with dimethyl ether addition, *Energy* (2018), doi: 10.1016/j.energy.2018.03.025

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

| 1 | Soot formation characteristics of ethylene premixed burner-stabilized stagnation flame |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | with dimethyl ether addition |
| 3 | Yinhu Kang ^{a,b,*} , Yuming Sun ^b , Xiaofeng Lu ^c , Xiaolong Gou ^c , Sicong Sun ^c , Jin Yan ^c , Yangfan Song ^c , |
| 4 | Pengyuan Zhang ^b , Quanhai Wang ^c , Xuanyu Ji ^d |
| 5 | ^a Postdoctoral Station of Environmental Science and Engineering, Chongqing University, Chongqing 400045, China |
| 6 | ^b Key Laboratory of the Three Gorges Reservoir Region's Eco-Environment, Ministry of Education, Chongqing |
| 7 | University, Chongqing 400045, China |
| 8 | ° Key Laboratory of Low-grade Energy Utilization Technologies and Systems (Chongqing University), Ministry of |
| 9 | Education of China, Chongqing 400044, China |
| 10 | ^d College of Mechanical and Power Engineering, Chongqing University of Science & Technology, Chongqing |
| 11 | 401331, China |
| 12 | |
| 13 | Abstract: Effect of dimethyl ether (DME) addition on PAH and soot formation mechanisms as well as particle-size |
| 14 | distribution function (PSDF) behavior of C ₂ H ₄ premixed burner-stabilized stagnation (BSS) flame was studied. A |
| 15 | wide range of DME addition from pure C_2H_4 to pure DME was considered. The sectional aerosol dynamics model |
| 16 | with detailed gas- and particle-phase kinetic mechanism was employed for the simulations. The results indicate that |
| 17 | soot growth rate by nucleation, and especially the H-abstraction- C_2H_2 -addition (HACA) mechanism and polycyclic |
| 18 | aromatic hydrocarbons (PAH) condensation increased significantly inside the stagnation boundary layer, due to |
| 19 | strong flame-wall interaction. The PSDF curve in the post-flame region was unimodal, while that in the stagnation |
| 20 | boundary layer was bimodal. The first peak of the PSDF curve in the stagnation boundary was resulted from the |
| 21 | enhanced nucleation rate, and the second peak was due to the intensified soot surface growth by HACA reaction |

^{*}Corresponding author: Tel./Fax: +86 023-65102475. E-mail address: cqukangyh@cqu.edu.cn (Y. Kang).

Download English Version:

https://daneshyari.com/en/article/8071893

Download Persian Version:

https://daneshyari.com/article/8071893

Daneshyari.com