

عنوان مقاله:

Efficient reduced mechanism proposed for the MILD combustion

محل انتشار:

سی و یکمین همایش سالانه بین المللی مهندسی مکانیک ایران و نهمین همایش صنعت نیروگاهی ایران (سال: 1402)

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خلاصه مقاله:

In the present work, the effects of the reduced and detailed mechanisms on the results of the MILD combustion and its runtime in a Jet in Hot Colflow (JHC) burner are numerically investigated. The five child reduced mechanisms of Luca (۱۶), Cazères (۲۶), LU (۳۰), DRM (۲۲), and Cazères (۳۶) along with their parents, the detailed mechanisms of GRI ۲.۱۱ and GRI ۳.۰ are investigated. Since, Luca (۱۶), DRM (۲۲), Cazères (۲۶), and LU (۳۰) have not reactions of NO formation, the postprocessing model is imposed, and for others, NO is directly predicted. The results show that distribution of the OH and temperature do not change significantly for various mechanisms due to involving most of the reactions producing most of the heat release rate. However, the distribution of CO and NO have discrepancy for Luca (۱۶) and Cazères (۲۶) due to the lack of reactions. Moreover, the child mechanisms results are similar to their parent. The postprocessing model cannot correctly predict NO near the burner exit. From runtime examination associated with considering an acceptable CO and the temperature prediction, it is found that the reduced mechanisms of DRM (۲۲) and Cazères (۲۶) are more efficient mechanism for the non-NOx simulations but with directly NO predictions, the reduced mechanism of Cazères (۳۶) is efficient due to taking a shorter time.

کلمات کلیدی:

MILD combustion, JHC burner, Reduced chemical mechanism, NO prediction, Simulation runtime

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