

ENTROPY GENERATION AND EXERGY ANALYSIS IN RADIATIVE HEAT TRANSFER SYSTEM WITH NON-GREY MEDIUM AND WALL

Zhongnong Zhang, Chun Lou*

State Key Laboratory of Coal Combustion, School of Energy and Power Engineering, Huazhong University of Science and Technology, Wuhan, 430074, Hubei, P. R. China

ABSTRACT. Radiative entropy generation and radiative exergy are important parameters in the analysis of radiative transfer process. Considering the spectral nature of thermal radiation, the radiative entropy generation and radiative exergy in a rectangular enclosure with non-grey participation medium and non-grey wall are analyzed. The Discrete Ordinates method was used to solve the radiative entropy generation equations, and then calculated radiative entropy generation, dimensionless entropy generation and radiative exergy in twelve cases under the uniform and unimodal temperature distributions of medium. The results indicated when the radiative properties in radiative heat transfer system are spectral match, the radiative heat transfer between medium and wall is enhanced, more available work is obtained, and the efficiency of radiative heat transfer is higher. So, in practice, we may select the coating material of wall surface with appropriate spectral emissivity according to the spectral characteristic of radiative properties of medium in practical high-temperature facilities.