RADIATIVE HEAT TRANSFER IN A PULVERIZED COAL COMBUSTION CYLINDRICAL FURNACE

Ahmed Boutoub[*], Hazem Ettouati[*], Hmaïed Benticha[*] and Mohamed Sassi[**]
[*]Laboratoire d'Etudes des Systèmes Thermiques et Energétiques
Ecole Nationale d'Ingénieurs de Monastir 5019, Monastir – Tunisia
[**]Chemical/Mechanical Engineering Departments,
The Petroleum Institute, P.O. Box 2533, Abu Dhabi, UAE
e-mail: msassi@pi.ac.ae

ABSTRACT. In this work, radiative heat transfer in axisymmetric Controlled Profile Reactor, fired with a pulverized coal combustion jet is studied. Radiation is investigated numerically by the Finite Volume Method (FVM). The developed numerical code is validated by comparing its predictions of the radiative heat flux with published experimental measurements. The non gray feature of the medium is analyzed using the Weighted Sum of Gray Gases Model (WSGG) when comparing gray and non gray results. Then the effects of the particles on the radiative heat flux and on the radiative source term are presented. Finally, the influence of the particle distribution and of the temperature fluctuations on the radiative transfer is investigated.

KEYWORDS

Radiative; Non-gray; Two-phase; Finite Volume Method; WSGG; Pulverized coal combustion.