Radiation characteristics of water droplets in a fire-inspired environment: a Monte Carlo ray tracing study

Bifen Wu, Xinyu Zhao

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Highlights

- A MCRT radiation solver that accounts for nongray gas, soot and water mist is developed
- The radiation attenuations by monodispersed/polydispersed water mists systems are evaluated in a three-dimensional cubic enclosure. Fourteen available benchmark results are provided.
- The importance of considering anisotropic scattering behaviors for water mists is investigated.
- Interactions between soot and water mist are parametrically studied.
- A tabulated method is proposed to account for the radiative properties of water mists based on the Mie theory. The tabulation method performs accurately and efficiently.