Conclusion:

This CFD model has successfully been implemented for the single-stage entrained flow gasifier using the coal as an inlet feedstock. The different models are applied related to combustion, devolatilization and gasification for the syngas production. In this study, almost 13 reactions were considered, which have four surface reactions and others are gas-phase reactions. The predicted mass fraction composition of carbon dioxide, carbon monoxide, hydrogen, temperature, velocity, and residence time provides a suitable gasification trend in the gasifier. The predicated composition of the syngas behavior is following the trend reported in the literature. The heterogeneous and homogeneous reactions play a vital role in the chemical equilibrium and due to these, the syngas composition is not in equilibrium at the outlet.

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