284c A CFD Study of Coal Gasification Using Eulerian-Granular Multiphase Model

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Coal gasification offers one of the most efficient and cleanest ways to convert the energy content of coal into electricity, hydrogen, and other energy forms. This technique is reviving lately because of the decrease of the petroleum and natural gas supplies and anticipated increase of the costs of natural gas.

The process of coal gasification is complicated because it involves intensively coupled multiphase flow and sophisticated chemical reactions. So, to model this process accurately is a very challenging task.

In this study we developed a coal gasification model using Eulerian-Eulerian approach under the environment of a commercial CFD software, Fluent. In this model, eleven species are included in the gas phase while four species are included in the solid phase. A total of sixteen reactions, both homogeneous and heterogeneous, are used to model the coal gasification chemistry. The comparisons will be presented between the simulation results and experimental measurements. The model performance, such as CPU speeds and parallel scalability, will also be discussed.