

Large scale CFD modelling of gas-particle flows in complex geometries

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Abstract

Multiphase flow reactors are widely used in process and energy industries. Understanding the complex phenomena of gas-particle flows is necessary when developing or improving many reactive and separation processes. In the past few decades, computational fluid dynamics has proven very valuable to increase our understanding of gas-solid flows. However current multiphase CFD models are limited to small scale reactors due to their computational complexity. New coarse-grained gas-particle models are emerging that can handle large scale systems. I will talk about how multiphase CFD models are efficiently developed and used to study large scale systems with complex geometries. I will show an example of CFD simulations for particle segregation in a rotating vortex chamber, and a large scale fluidized bed CO₂ capture unit.

Short CV

Since January 2017, Dr. Vikrant Verma is working as a postdoc researcher in the Process & Energy Department at Delft University of Technology. In the years 2014-2016 he was a postdoc at the Multiphase Flow group of the National Energy Technology Laboratory (NETL) in West Virginia USA. In 2014, he received his PhD degree in chemical engineering from Eindhoven University of Technology, Netherlands. He completed his B-Tech and M-Tech in chemical engineering from the Indian Institute of Technology in Delhi India. His research focuses on multi-scale modeling of gas-particle flows in large scale equipment with complex geometries.