

SIMULATIONS OF FLUIDISED BEDS USING A COUPLED MOLECULAR DYNAMICS AND CONTINUUM METHOD FOR RHEOLOGY AND STABILITY STUDIES

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In this work, we study micro-structural properties suspensions of particles of high Stokes number, eg fluidised beds, and their influence on the macroscopic properties of suspensions often used in continuum models of such flows, such as particle viscosity and particle pressure. This is carried out via a hybrid model in which the motion of the particles is solved explicitly, via a molecular dynamics technique, coupled with the solution of the standard averaged equation for the fluid. The methods are coupled by a model of hydrodynamic force acting on the particles that is dependent on the local average velocity of the flow. With this method, we can have to access local particle concentration fluctuations and study their influence on the rheology of the particulate phase and on the stability of the flow. We present some results for the particle viscosity and the particle pressure, as well as some results comparing the stability of liquid and gas fluidised beds.

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