Numerical simulation of rising bubble with chemical reaction
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OMAR MATAR, Imperial College London, GEORGE KARAPETSAS, University of Thessaly, Volos 38334, Greece — The dynamics of a rising bubble under the action of gravity and in the presence of an exothermic chemical reaction at the interface is investigated via direct numerical simulation using Volume-of-Fluid (VOF) method. The product of the chemical reaction, and temperature rise due to the exothermic chemical reaction influence the local viscosity and surface tension near the interfacial region, which in turn give rise to many interesting dynamics. The flow is governed by continuity, Navier-Stokes equations along with the convection equation of the volume fraction of the outer fluid and the energy equation. The effects of the Bond, Damkohler, and Reynolds numbers, and of the dimensionless heat of reaction are investigated. The results of this parametric study will be presented at the meeting.

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