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Dynamics of single rising bubbles in a liquid-solid system NASIM HOOSHYAR, ROBBERT F. MUDDE, PETER J. HAMERSMA, Delft University of Technology, SANKARAN SUNDARESAN, Princeton University, J. RUUD VAN OMMEN, Delft University of Technology — While the dynamics of single rising gas bubbles in clear liquids has been studied extensively, the dynamics of bubbles in liquid-solid slurries containing small particles ($d_s < 100\mu$m) is not yet well understood. We have investigated the rise characteristics of single gas bubbles ($< d_b >$=3mm) in a neutrally buoyant suspension of Polystyrene particles ($< d_s > = 78\pm5.79\mu$m) in a glycerol-water mixture. Using a four-point optical probe we have obtained information on the bubble motion and shape in the slurry. The velocity of single bubbles, rising at terminal velocity through the suspension, slightly decreases with increasing solids volume fraction; this was accompanied by a change in the shape of the bubbles from oblate ellipsoidal to nearly spherical. The viscosity and the surface tension of the liquid in the presence of suspended particles were also measured. Our results show that the viscosity was almost doubled with a 20% increase in the solids volume fraction. We found that the rise velocity of a bubble in the slurry is close to that in a pseudo-single phase liquid with the same viscosity and surface tension.

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