

Analysis of Two Phase Hydrodynamics in a Column Flotation by Particle Image Velocimetry

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Abstract : The hydrodynamic behavior in a laboratory column flotation was analyzed using particle image velocimetry. For complete characterization of column flotation, it is necessary to determine the flow velocity induced by bubbles in the liquid phase, the bubble velocity and bubble characteristics: diameter, shape and bubble size distribution. An experimental procedure for analyzing simultaneous, phase-separated velocity measurements in two-phase flows was introduced. The non-invasive PIV technique has used to quantify the instantaneous flow field, as well as the time averaged flow patterns in selected planes of the column. Using the novel particle velocimetry (PIV) technique by the combination of fluorescent tracer particles, shadowgraphy and digital phase separation with masking technique measured the bubble velocity as well as the Reynolds stresses in the column. Axial and radial mean velocities as well as fluctuating components were determined for both phases by averaging the sufficient number of double images. Bubble size distribution was cross validated with high speed video camera. Average turbulent kinetic energy of bubble were analyzed. Different air flow rates were considered in the experiments.

Keywords : particle image velocimetry (PIV), bubble velocity, bubble diameter, turbulent kinetic energy

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