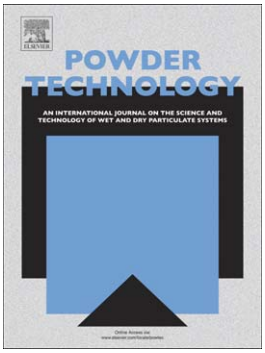

Study on laminar flow containing fibre particles in a stirred tank using DPIV

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Study on laminar flow containing fibre particles in a stirred tank using DPIV

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Abstract

Solid-liquid two-phase flow is often encountered in stirred tanks. However, for the sake of simplicity, solid particles are usually taken as spherical particles. As to non-spherical particles in stirred tanks, seldom literature is involved. In this paper, the experiments about fibre particles in laminar flow are performed with the help of digital Particle Image Velocimetry (DPIV). The emphasis of this work is to measure velocity and orientations of fibre particles simultaneously in a stirred tank. Fibre particles with different aspect ratios of 18.8, 25.0 and 37.5 are experimented with Reynolds number (Re) varying from 4.5 to 13.6, respectively. The orientations of particles at various locations under different laminar conditions are obtained. In addition, the influences of impeller speed, solid concentration and aspect ratio of fibre particles on orientations are discussed. The results show that both the radial and axial velocities increase with the increase of impeller speed, while velocities rarely have any variation with the aspect ratio. On the contrast, the influence of the aspect ratio on orientation is obvious and sharp. The angle between the particle and the horizontal

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