

TRANSPORT PHENOMENA & FLUID MECHANICS

搅拌槽内的 Rushton 桨叶周围流场的 PIV 测量

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摘要 In this paper, particle image velocimetry (PIV) was used to measure the mean and root mean square(RMS) velocity in the stirred tank with six-flat blade Rushton turbine and with no baffles. Two types of motion patterns were studied. One was that the impeller runs at constant speed, the other was that the impeller runs at time-dependent speed and in a periodic way. The emphasis of the paper was on the comparison of mean and RMS velocity vector maps and profiles between these two types of motion patterns, and especial attention was paid to the comparison of the mean velocity, time-averaged RMS velocity, phase averaged RMS velocity between the constant 3 RPS (revolution per second) and time-dependent operation. The Reynolds number was between 763 and 1527. The study explained the mechanism that time-dependent RPS is more efficient for mixing than that of constant RPS.

关键词

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Flow Field Around Rushton Turbine in Stirred Tank by Particle Image Velocimetry Measurement

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Abstract In this paper, particle image velocimetry (PIV) was used to measure the mean and root mean square(RMS) velocity in the stirred tank with six-flat blade Rushton turbine and with no baffles. Two types of motion patterns were studied. One was that the impeller runs at constant speed, the other was that the impeller runs at time-dependent speed and in a periodic way. The emphasis of the paper was on the comparison of mean and RMS velocity vector maps and profiles between these two types of motion patterns, and especial attention was paid to the comparison of the mean velocity, time-averaged RMS velocity, phase averaged RMS velocity between the constant 3 RPS (revolution per second) and time-dependent operation. The Reynolds number was between 763 and 1527. The study explained the mechanism that time-dependent RPS is more efficient for mixing than that of constant RPS.

Key words

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