RESEARCH PAPERS

三相间歇流化床中非粘附与粘附体系的沉降-分散模型

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摘要 The axial concentration distribution of both particles with better wetting (forming non-attached system)and poorer wetting (forming attached system) was investigated in a vertical gas-liquid-solid fluidized bed of 4.2 cm indiameter and 130 cm in height with the solids holdup less than 0.05. The one-dimensional sedimentation-dispersionmodel could be used satisfactorily to describe the axial distribution of solids holdup by modifying only a modelparameter, i.e. by means of the terminal settling velocity minus a certain value, which is a function of gas velocityand considers the effect of an additional drag force resulted from attached rising bubbles. The axial profiles of solidconcentration predicted are in good agreement with experimental results. This model also explains reasonably thedifferent axial distributions of solid concentration, i.e. the solids holdup decreases as the axial height increases innon-attached system, but increases with the axial height in attached system at a given gas velocity.

关键词 three-phase fluidized bed terminal settling velocity sedimentation-dispersion model

axial distributionof solids holdup

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A Sedimentation-Dispersion Model for both Non-attached and Attached Particles in Three-Phase Batchwise Fluidized Beds

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Abstract The axial concentration distribution of both particles with better wetting (forming non-attached system)and poorer wetting (forming attached system) was investigated in a vertical gas-liquid-solid fluidized bed of 4.2 cm indiameter and 130 cm in height with the solids holdup less than 0.05. The one-dimensional sedimentation-dispersionmodel could be used satisfactorily to describe the axial distribution of solids holdup by modifying only a modelparameter, i.e. by means of the terminal settling velocity minus a certain value, which is a function of gas velocityand considers the effect of an additional drag force resulted from attached rising bubbles. The axial profiles of solidconcentration predicted are in good agreement with experimental results. This model also explains reasonably thedifferent axial distributions of solid concentration, i.e. the solids holdup decreases as the axial height increases innon-attached system, but increases with the axial height in attached system at a given gas velocity.

Key words three-phase fluidized bed; terminal settling velocity; sedimentation-dispersion model; axial distributionof solids holdup

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