

以非晶态合金催化剂SRNA-4为固相的气液固磁稳定床的界面传质研究

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摘要 Gas-liquid (G-L) and liquid-solid (L-S) mass transfer coefficients were characterized in a gas-liquid-solid (G-L-S) three-phase magnetically stabilized bed (MSB) using amorphous alloy SRNA-4 as the solid phase. Effects such as superficial liquid velocity, superficial gas velocity, magnetic strength, liquid viscosity, and particle size were investigated. Experimental results indicated that the G-L volumetric mass transfer coefficients (K_L) increased along with the magnetic strength, superficial gas and liquid velocities. Proper increase of liquid viscosity promoted K_L only in the range of lower liquid viscosity. The external magnetic field made L-S mass transfer coefficients (K_s) in the G-L-S MSB lower than those of conventional fluidized beds. K_s in the MSB almost kept constant as the superficial liquid velocity and superficial gas velocity increased and decreased with the liquid viscosity and surface tension, while increased with the particle size. K_s showed uniform axial and radial distributions except of small decreases close to the wall. Dimensionless correlations were established to estimate K_L and K_s of the MSB with SRNA-4 catalysts, which showed the average error of 5.4% and 2.5% respectively.

关键词 [magnetically stabilized bed](#), [gas-liquid mass transfer](#), [liquid-solid mass transfer](#), [SRNA-4 catalyst](#)

分类号

Interphase mass transfer in G-L-S magnetically stabilized bed with amorphous alloy SRNA-4 catalyst

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Abstract

Gas-liquid (G-L) and liquid-solid (L-S) mass transfer coefficients were characterized in a gas-liquid-solid (G-L-S) three-phase magnetically stabilized bed (MSB) using amorphous alloy SRNA-4 as the solid phase. Effects such as superficial liquid velocity, superficial gas velocity, magnetic strength, liquid viscosity, and particle size were investigated. Experimental results indicated that the G-L volumetric mass transfer coefficients (K_L) increased along with the magnetic strength, superficial gas and liquid velocities. Proper increase of liquid viscosity promoted K_L only in the range of lower liquid viscosity. The external magnetic field made L-S mass transfer coefficients (K_s) in the G-L-S MSB lower than those of conventional fluidized beds. K_s in the MSB almost kept constant as the superficial liquid velocity and superficial gas velocity increased and decreased with the liquid viscosity and surface tension, while increased with the particle size. K_s showed uniform axial and radial distributions except of small decreases close to the wall. Dimensionless correlations were established to estimate K_L and K_s of the MSB with SRNA-4 catalysts, which showed the average error of 5.4% and 2.5% respectively.

Key words [magnetically stabilized bed](#), [gas-liquid mass transfer](#), [liquid-solid mass transfer](#), [SRNA-4 catalyst](#)

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▶ 本刊中 包含 " "magnetically stabilized bed" 的 相关文章
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