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关于GSL沉淀过程实验和理论研究

李会玉,郭宏伟,刘学武,刘小伟,刘小勇

R&D Institute of Fluid and Powder Engineering, Dalian University of Technology, Dalian 116012, China

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摘要 The supercritical antisolvent (SAS) process has been developed in recent years for the formation of nanosized micro-particles. It is necessary to study the liquid phase volume expansion (LPVE) and find the relationships between the operating conditions and the LPVE in order to develop a practical manifest for determining the operation conditions and selecting an organic solvent for SAS process. The PR equation of state with vdW...

1 mixing rule is used to calculate the LPVE for CO2/toluene, CO2/benzene and CO2/ethyl acetate systems, and the results show that the LPVE for each CO2/organic solvent system decreases as the temperature increases. The relationship between the LPVE and the solubility of CO2 in the liquid phase for CO2/organic solvent systems is investigated, and the results show that the LPVE is determined directly by the solubility of CO2 in the liquid phase, xCO2, and can be related to xCO2 independently. No matter what system of CO2/organic solvent is and how different the temperature is, the LPVEs have little difference as long as the solubility of CO2 in the liquid phase, xCO2, keeps constant. The lower temperature is always favorable to the SAS process. The higher the solubility of CO2 in an organic solvent under certain operation condition, the more suitable it is to the SAS process.

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Study of the Liquid Phase Volume Expansion for CO2/Organic Solvent Systems

LI, Huiyu; GUO, Hongwei; LIU, Xuewu; HONG, Xiaoliang; Wu, Xuyong

R&D Institute of Fluid and Powder Engineering, Dalian University of Technology, Dalian 116012, China

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Abstract The supercritical antisolvent (SAS) process has been developed in recent years for the formation of nanosized micro-particles. It is necessary to study the liquid phase volume expansion (LPVE) and find the relationships between the operating conditions and the LPVE in order to develop a practical manifest for determining the operation conditions and selecting an organic solvent for SAS process. The PR equation of state with vdW1 mixing rule is used to calculate the LPVE for CO2/toluene, CO2/benzene and CO2/ethyl acetate systems, and the results show that the LPVE for each CO2/organic solvent system decreases as the temperature increases. The relationship between the LPVE and the solubility of CO2 in the liquid phase for CO2/organic solvent systems is investigated, and the results show that the LPVE is determined directly by the solubility of CO2 in the liquid phase, xCO2, and can be related to xCO2 independently. No matter what system of CO2/organic solvent is and how different the temperature is, the LPVEs have little difference as long as the solubility of CO2 in the liquid phase, xCO2, keeps constant. The lower temperature is always favorable to the SAS process. The higher the solubility of CO2 in an organic solvent under certain operation conditions, the more suitable it is to the SAS process.

Key words supercritical antisolvent process; liquid phase volume expansion; carbon dioxide; organic solvent;

通讯作者 李会玉 lhuiyu@dlut.edu.cn

作者个人主页: 李会玉; 郭宏伟; 刘学武; 刘小伟; 刘小勇

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