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热力学

乙烯和丙烯在低聚物-正己烷溶液中的溶解度及体积传质系数测定

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摘要

在高压搅拌釜中，利用气体间歇物理吸收技术，在温度343～393 K、压力0.2～1.45 MPa下，测定了乙烯-正己烷、丙烯-正己烷、乙烯-正己烷-低聚物（低分子量聚乙烯）和丙烯-正己烷-低聚物的气体平衡溶解度与液相体积传质系数k_La，并回归出表观溶解热，使用PC-SAFT状态方程关联了汽液平衡数据，拟合得到乙烯/丙烯-正己烷-低聚物的k_La经验关联式，与实验结果吻合良好。实验系统考察了压力、温度和低聚物浓度对平衡溶解度和k_La的影响，结果表明：压力升高，气体溶解度增大，符合亨利定律，k_La略有降低;温度升高，气体溶解度减小，乙烯在正己烷中的k_La增大，丙烯在正己烷中的k_La则减小;低聚物浓度增加，气体溶解度与k_La均降低。

关键词

乙烯 丙烯 正己烷 低聚物 气体平衡溶解度 液相体积传质系数

分类号

Solubility and volumetric mass transfer coefficient of ethylene and propylene in *n*-hexane solution of low molecular weight polyethylene

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Abstract

Equilibrium gas solubility and volumetric mass transfer coefficient (k_La) of ethylene/*n*-hexane, propylene/*n*-hexane, ethylene/*n*-hexane/low molecular weight polyethylene (LMW HDPE) and propylene/*n*-hexane/ LMW HDPE systems were obtained in a Buchi autoclave, using the transient physical gas absorption technique, under the pressure from 0.2 MPa to 1.45 MPa, and the temperature from 343 K to 393 K.The apparent dissolution heat was obtained by regression.The PC-SAFT equation of state was used to correlate the gas-liquid equilibrium data, while an empirical correlation to predict the k_La values was proposed, and the model value matched the experimental results well.The effects of pressure, temperature and LMW HDPE concentration on gas solubility and k_La were investigated.The results showed that the gas solubilities obeyed the Henry's law, while it decreased with increasing temperature and LMW HDPE concentration.The k_La values were found to drop slightly with increasing pressure and decrease dramatically with increasing LMW HDPE concentration.Particularly, k_La increased for ethylene/*n*-hexane and decreased for propylene/*n*-hexane with increasing temperature.

Key words

ethylene propylene *n*-hexane low molecular weight polyethylene gas solubility volumetric mass transfer coefficient

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