高等学校化学学报 2006 , 27 (9): 1779-1781 ISSN: 0251-0790 CN: 22-1131/O6

研究简报

聚合物流体的范德华凝聚行为

乔宝福, 赵得禄

中国科学院化学研究所高分子物理与化学国家重点实验室, 北京 100080

收稿日期 2005-12-31 修回日期 网络版发布日期 2006-9-20 接受日期

摘要 研究了由聚合物的范德华作用导致的凝聚行为. 研究发现, 尽管聚合物同小分子的相行为的形成原因不同(聚合物体系的相行为是由动能、构象熵项和范德华作用能三项相互竞争的结果, 而小分子的相行为是由动能和范德华作用能相互竞争的结果), 但是它们表现出了极为相似的相行为.

关键词 范德华作用 聚合物流体 相图 蒸气压 负压强

分类号 0631

Van der Waals Condensed Behavior of Polymer Fluids

QIAO Bao-Fu, ZHAO De-Lu

State Key Laboratory of Polymer Physics and Chemistry, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100080, China

Abstract The condensed behavior of polymer fluids were studied based on the van der Waals interaction. By comparing the phase diagram of pure polymer fluids and that of van der Waals non-ideal fluids, it is found that (1) pure polymer fluids show a similar phase diagram to van der Waals non-ideal fluids; (2) the differences between the phase diagrams were caused by the difference of chain lengths. It is explained that why the vapor pressure of polymer is hard to detect and why the negative pressure can exist in polymer liquids. It is also found that some scaling relations exist between the reduced critical pressure and the chain length, and the reduced critical volume and the chain length.

Key words Van der Waals interaction Polymer fluid Phase diagram Vapor pressure Negative pressure

DOI:

通讯作者 赵得禄 zhaodl@iccas.ac.cn