

研究论文

聚偏氟乙烯-稀释剂间介电常数差异对热致相分离法制膜微观结构的影响

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摘要 采用1,4-丁内酯、邻苯二甲酸二甲酯、水杨酸甲酯、邻苯二甲酸二丁酯、三醋酸甘油酯和卡必醇醋酸酯作为稀释剂,研究了在以热致相分离(TIPS)法制备聚偏氟乙烯(PVDF)微孔膜过程中,聚偏氟乙烯-稀释剂间介电差异对PVDF膜微观结构的影响.实验发现,PVDF-稀释剂间介电常数的差异与PVDF膜微观结构有一定关联.当PVDF介电常数大于稀释剂的介电常数时,PVDF的分子间作用以引力为主导,PVDF分子易于聚集结晶,形成松散球粒结构.当PVDF介电常数与稀释剂的介电常数相近时,PVDF的分子间引力作用与斥力作用相均衡,在淬冷条件下可形成近似双连续结构.当PVDF介电常数小于稀释剂的介电常数时,PVDF分子间有一定的斥力效应,PVDF分子结晶困难.

关键词 [介电常数](#) [聚偏氟乙烯](#) [稀释剂](#) [热致相分离](#) [微孔膜](#)

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Effect of Difference of Dielectric Constants Between Polyvinylidene Fluoride and Diluents on the Morphology of Polyvinylidene Fluoride Membranes Prepared by Thermally Induced Phase Separation

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Abstract The effect of difference of dielectric constants between polyvinylidene fluoride(PVDF) and diluents on morphology of PVDF membranes prepared by thermally induced phase separation(TIPS) was studied. 1,4-Butyrolactone, dimethyl phthalate, methyl salicylate, glycerol triacetate, carbitol acetate and di-*n*-butyl phthalate were selected as the diluents, respectively. The results show that the difference in dielectric constants between PVDF and diluents have a certain relationship with the morphology of membrane. The dielectric constant is one of important parameters of interaction among molecules. When the dielectric constant of PVDF is larger than that of the diluent, the attractive interaction among PVDF molecules led to the aggregation of PVDF and crystallization. The incompact particle structure formed. When PVDF and diluents have a similar dielectric constant, attraction and repulsion exist in the equilibrium. The channel-like structure is formed under the condition of quenching. If the dielectric constant of PVDF is smaller than that of diluent, PVDF molecules crystallize difficultly in the diluent due to the repulsive interaction.

Key words [Dielectric constant](#) [Polyvinylidene fluoride](#) [Diluent](#) [Thermally induced phase separation](#) [Microporous membrane](#)

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