高分子学报 2004 (6): 871-876 ISSN: 1000-3304 CN: 11-1857/O6

论文

苯乙烯 / 马来酸酐和苯乙烯 / 甲基丙烯酸二甲氨基乙酯二元体系在聚四氟乙烯多孔膜上的γ辐射接枝

闫宇, 伊敏, 翟茂林, 哈鸿飞

北京大学化学与分子工程学院; 北京大学化学与分子工程学院 北京

收稿日期 2003-11-3 修回日期 2003-12-15 网络版发布日期 接受日期

摘要 在氮气的氛围下用γ辐照的方法在聚四氟乙烯多孔膜上接枝苯乙烯/马来酸酐、苯乙烯/甲基丙烯酸二甲氨基乙酯二元单体. 并且研究了剂量、剂量率、溶液中单体的浓度和二元单体的摩尔比等条件对接枝率的影响 . 探讨了两种单体的竞聚率对接枝率、接枝膜的组成及性能的影响 . 结果表明 , 苯乙烯 马来酸酐二元体系对接枝率有协同效应 , 苯乙烯/甲基丙烯酸二甲氨基乙脂二元体系对接枝率表现为加合效应 . 制备的二元接枝的聚四氟乙烯多孔膜可以进一步磺化来制备用于质子交换膜燃料电池的质子交换膜.

关键词 苯乙烯 马来酸酐 甲基丙烯酸二甲氨基乙酯 聚四氟乙烯 二元单体辐射接枝 竞聚率

分类号

RADIATION GRAFTING OF STYRENE/MALEIC ANHYDRIDE OR STYRENE/DIMETHYLAMINO ETHYL METHACRYLATE BINARY SYSTEMS ONTO POLYTETRAFLUOROETHYLENE POROUS MEMBRANES

YAN Yu,YI Min,ZHAI Maolin,HA Hongfei

College of Chemistry and Molecular Engineering; Peking University; Beijing 100871

Abstract Radiation-induced grafting of binary grafting systems of styrene (St) / maleic anhydride (MAn) or St / dimethylamino ethyl methacrylate (DMAEMA) onto polytetrafluoroethylene (PTFE) porous membranes was studied. Grafting was carried out using γ-radiation from a ^{60}Co source at room temperature. The effects of absorbed dose,dose rate,the initial comonomer concentration,and the molar ratio of both monomers in the grafting solution on the degree of grafting were investigated. The degree of grafting was found to be strongly dependent upon the grafting conditions. The effect of the reactivity ratio of two monomers on the degree of grafting,the composition and characteristics of the grafted film were measured and discussed. There is a synergistic effect in St/MAn binary system,but a weak antagonistic effect in St/DMAEMA system. The grafted PTFE porous membranes can be used after sulfonation as proton exchange membranes for proton exchange membrane fuel cell.

Key words Styrene Maleic anhydride Dimethylamino ethyl methacrylate Radiation-induced grafting PTFE film Reactivity ratio

DOI:

通讯作者 翟茂林