

论文

锂离子二次电池用PVDF-HFP/PAMA共混物基聚合物电解质膜的研制

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摘要 以丙烯腈(AN)、甲基丙烯酸甲酯(MMA)、丙烯醛(A)为单体,采用乳液聚合法制成一种共聚物——聚(丙烯腈-甲基丙烯酸甲酯-丙烯醛)(PAMA).将PAMA作为第二共聚物与聚(偏氟乙烯-六氟丙烯)(PVDF-HFP)共混,并向反应体系中添加纳米级SiO₂,充分混合后利用二次相转移法制得薄膜,并对所得薄膜的断面形貌、吸附性能、热性能、导电性能等进行了测试.研究发现, SiO₂ 的加入增大了膜中微孔体积,改善了微孔分布,且增大了电解液的吸附量;共聚物PAMA的组成影响薄膜的吸附性能,其中极性较大的丙烯醛单元和丙烯腈单元起着决定性作用;PAMA含量的增加使得共混膜吸附电解液量增加.制得共混膜的离子电导率达 $2.30 \times 10^{-3} \text{S/cm}$.

关键词 [聚合物锂离子电池](#) [电解质膜](#) [聚\(偏氟乙烯-六氟丙烯\)](#)

分类号

POLYMER ELECTROLYTES BASED ON PVDF-HFP/PAMA BLENDS FOR RECHARGEABLE BATTERY LITHIUM-POLYMER BATTERIES

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Abstract A terpolymer PAMA was synthesized via emulsion polymerization with monomers of acrylonitrile(AN), methyl methacrylate(MMA), and acrolein(A). The terpolymer PAMA was blended with poly(vinylidene fluoride-hexafluoropylene) (PVDF-HFP), and nanometer SiO₂ was added to the system. The microporous film was prepared by phase-immersion technique. SEM, adoption, thermal properties were used to characterize the films, and conduction properties were investigated. The studies showed that the addition of SiO₂ increased the pore volume, benefited the pore distribution and enhanced the uptake of liquid electrolyte; the composition of terpolymer PAMA, mainly the units of acrolein and acrylonitrile, affected the properties of the films significantly; the uptake of liquid electrolyte increased with increasing PAMA content. The ionic conductivity of the polymer electrolytes reached $2.30 \times 10^{-4} \text{s/cm}$.

Key words [Lithium ion polymer batteries](#) [Polymer electrolytes](#) [Poly\(vinylidene fluoride-hexafluoropylene\)](#)

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