

Characteristics of electrospun Poly(acrylonitrile)/SiO₂ composite polymer electrolyte membrane

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Poly(acrylonitrile) (PAN) is considered as a good polymer electrolyte membrane in rechargeable battery owing to mechanical property and chemical stability. However, PAN is limited about electrochemical performance due to the restriction of morphology. This work is focused on the enhancement of electrochemical performance by inducing microporous morphology using electrospinning technique and SiO₂ as inorganic filler. Microporous poly (acrylonitrile)/SiO₂ composite polymer electrolyte membrane was prepared by an electrospinning technique. The microporous morphology of PAN makes ion mobility much free, and silica keeps hold-up of liquid electrolyte easier. This led to much higher ionic conductivity. The morphology of the fiber web was analyzed by scanning electron microscopy (SEM) and the thermal stability was also analyzed by thermo gravimetric analysis(TGA), differential scanning calorimeter(DSC). The electrochemical performance of polymer electrolytes membrane were carried out using assembled Li-ion Polymer cell fabricated LiCoO₂ as cathode and graphite as anode.