

Preparation of Highly Porous PAN-TiO₂, AlO₃, TiO₃ Membranes as Separators for Lithium ion batteries

이지혜, 김재광[†]

청주대학교

(jaekwang@cju.co.kr[†])

In this study, polyacrylonitrile was mixed with TiO₂, AlO₃ and BaTiO₃ to manufacture composite gel polymer electrolyte by electrospinning. Separators are a vital component to ensure the safety of lithium-ion batteries. However, the commercial separators employed in lithium ion batteries are inefficient due to their low porosity. In the present study, a simple electrospinning technique is adopted to prepare highly porous PAN based membranes with a higher concentration of ceramic particles, as a viable alternative to the commercialized separators used in lithium ion batteries. Ceramic has high liquid electrolyte wettability because electrolytes are absorbed through pores made between polymers and ceramics. Also, thinner fiber diameter and electrochemical stability and open resistance with electrodes are improved and electrochemical properties are improved. The effect of the ceramic particles on the morphology of the porous membranes is demonstrated through Field emission scattering electron microscopy. The incorporation of high dielectric constant ceramic particle will be good strategy to enhance the stability and electrochemical properties of lithium polymer batteries.