

## BFA5

### PEO-based Composite Polymer Electrolytes with Micrometer Ceramic Fillers Prepared by Ball Milling

볼밀링으로 제조된 마이크로 세라믹 충전제를 갖는 복합 고분자 전해질의 특성

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Recently, composite polymer electrolytes have attracted a great deal of interest for lithium secondary batteries and most studies on the ceramic fillers have focused on the inorganic nanosize particles such as  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2$  and  $\gamma$ - $\text{LiAlO}_2$  et al. Nanocomposite polymer electrolytes generally have a very stable lithium electrode interface and an enhanced ionic conductivity at low temperature and good mechanical property.

Electrochemical and thermal characteristics on PEO-based composite polymer electrolytes with various ceramic fillers are presented. The amount of ceramic fillers added to the composite polymer electrolytes varies between 5wt% and 15wt%. The introduced ceramic fillers in this study consisted of particles having mean size of between approximately  $2\mu\text{m}$  and  $20\mu\text{m}$  which contained various phases such as  $\text{Ti}_n\text{O}_{2n-1}$ ,  $\text{Li}_2\text{O}_2$  and  $\text{PbO}$ . The ionic conductivity was enhanced using micrometer size ceramic fillers. The effect of the micrometer size ceramic filler increases ionic conductivity by an order of magnitude compared with polymer electrolyte free of ceramic filler. Composite polymer electrolyte with titanium oxide as ceramic filler resulted in highest ionic conductivity of the order of  $2.6 \times 10^{-4} \text{Scm}^{-1}$  at elevated temperature. Lithium/Composite polymer electrolyte/Sulfur cells have a reversible capacity of between 1300 and 1600mAh/g at the current rate of 100mA/g · sulfur at 90°C.