

## BFA4

### The Characteristics of PEO-LiX(LiX=LiCF<sub>3</sub>SO<sub>3</sub> and LiBF<sub>4</sub>) Polymer Electrolytes Prepared by Ball Milling for Li/S Battery 볼밀링법으로 제조된 Li/S 전지용 PEO계 고분자 전해질의 특성

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The polymer electrolytes, consisting of poly(ethylene oxide)(PEO) and lithium salt such as LiCF<sub>3</sub>SO<sub>3</sub> and LiBF<sub>4</sub> have been prepared by ball milling method, which was performed at various time(2, 4, 8, 12hrs) with ball:sample=400:1 ratio, and their electrochemical and physical characteristics were evaluated. The micro structure and morphology of PEO-LiX(LiX=LiCF<sub>3</sub>SO<sub>3</sub> and LiBF<sub>4</sub>) polymer electrolyte were changed into amorphous and smaller spherulite texture by ball milling. The morphologies of the polymer electrolytes exhibit the spherulitic texture, which consists of individual spherulites ranging from several tens to hundreds micrometers in diameter. The dimension of spherulites depends on various factors which may control nucleation density per unit area such as purity of solution, film thickness and rate and uniformity of solvent removal. The ionic conductivity on PEO-LiX polymer electrolytes prepared by ball milling was increased about one order of magnitude higher than that without ball milling, and also have remarkably the higher ionic conductivity at low temperature. A maximum value in the ionic conductivity was found for the PEO-LiX prepared by ball milling for 12hrs and was  $2.52 \times 10^{-4}$  S/cm for LiCF<sub>3</sub>SO<sub>3</sub> and  $4.99 \times 10^{-4}$  S/cm for LiBF<sub>4</sub> at 90°C.

The first discharge capacity on Li/S cells increased with increasing ball milling time. The (PEO)<sub>10</sub>LiCF<sub>3</sub>SO<sub>3</sub> polymer electrolyte prepared by ball milling was shown the typical two plateau discharge curves on Li/S battery, but upper voltage plateau for the polymer electrolyte containing LiBF<sub>4</sub> was very different from typical shape.

#### References

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