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## Preparation and Characterization of Fly Ash/PVdF-PAN Composite Polymer Electrolyte Membranes and their Potential Use for Li-ion Batteries

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**Abstract :** This paper presents an effort to increase mechanical and conductivity properties of PVdF-PAN electrolyte membrane via addition of fly ash. The polymer electrolyte membranes were prepared by non-solvent induced phase separation (NIPS) method using different concentration and particle size of fly ash. The prepared membranes were then characterized including surface morphology (by SEM), surface chemistry (by FTIR spectroscopy), porosity, electrolyte uptake, crystallinity (by X-Ray Diffraction), mechanical properties and ionic conductivity. The results show that the addition of fly ash decreases membrane crystallinity and increases membrane porosity. Further, increasing both tensile strength and ionic conductivity about two times greater than the membrane without addition of fly ash is clearly observed. In general, the results suggest that the electrolyte membranes prepared with addition of fly ash show better characteristics with respect to Li-ion batteries application.

**Keywords :** Fly ash, Li-ion batteries, PVdF- PAN polymer electrolyte membrane, composite embrane.

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