Synthesis of Polyimide aerogel binder with polyvinylidene fluoride for secondary cell separator

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Most of secondary cell uses polyethylene and polypropylene as separator, which has crucial safety problems. Its shrinkage more than 80% of original form at high temperature can cause lots of accident like battery explosion. In this study, we successfully fabricated composite membrane for preventing shrinkage and also maintaining conductivity of polyethylene or polypropylene. This composite membrane is composed of Polyimide aerogel which has excellent thermal and mechanical characteristics attached both sides of polyethylene using polyvinylidene fluoride as adhesive. Shrinkage test was implemented at 30℃, 150℃, 200℃ and 250℃. Mechanical properties of membrane were measured by UTM. It's solvent uptake rate and ion conductivity was measured to compare with original polyethylene. And also inner structure of membrane was observed by field emission-scanning electron microscopy.