

Effect of ceramic in gel polymer electrolyte for high-Ni lithium batteries

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ceramic composite gel polymer electrolytes for high Ni lithium batteries were prepared and the effects of ceramics were studied. As an alternative to the low safety of commercially available electrolytes used in lithium-ion batteries, a gel polymer electrolyte in which 40wt% of Al<sub>2</sub>O<sub>3</sub>, BaTiO<sub>3</sub>, and TiO<sub>2</sub> ceramic particles are combined was manufactured. For high porosity, the membrane was produced by electrospinning. The effect of ceramic particles on the morphology of the porous membrane is demonstrated by FE-SEM. XRD, FT-IR and FT Raman studies adequately demonstrate interaction of PAN and ceramic particles in a polymer matrix. TGA and thermal shrinkage studies show that it is thermally stable compared to commercially available separators. The coin cell made of ceramic composite membrane and NCM811 cathode was tested at various C-rates and two different cut-off zones. The coin cell maintains over 83.7% of the average initial discharge capacity after 100 cycles of charging and discharging at 0.5 C-rate, showing excellent cycle stability.

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