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Abstract

Temperature-dependent on/off PVP@TiO_2 separator for Li-ion batteries (LIBs) has been fabricated by using a modified electrospinning method. The PVP@TiO_2 separators show excellent wettability towards liquid electrolytes and high ionic conductivity due to its high porosity and outstanding capillarity. The battery with PVP@TiO_2 separator will be suspended as the operation temperature reaches 60°C, then revives after being brought back to room temperature. The PVP@TiO_2 separator is thermally stable up to 180°C without significant dimensional shrinkage. The structural integrity of the hybrid separator can be maintained even after being heat-treated at 500°C. The use of this hybrid separator is one approach to improve the reliability and safety of the LIBs.

Keywords: on/off separator; Li-ion batteries; capillarity; reliability; TiO_2 nanotubes