

Alumina/polymer dual coated polyethylene film for safety reinforced Li-ion battery separator

김진일, 정종엽¹, 전영민², 박종혁^{1,†}

연세대학교; ¹연세대학교 화공생명공학과; ²화공생명공학과

(lutts@yonsei.ac.kr[†])

In this report, we propose an inorganic-organic hybrid coating strategy that enhances the thermal and dimensional stability of polymer battery separators without increasing the overall separator thickness. Ultrathin coating layers prepared using a combination of atomic layer deposition and polydopamine treatment cover fibrils of a porous polyethylene separator more uniformly and endow polyethylene separators with superior thermal properties compared to those coated with only one layer, which is linked to the safety of battery cells. In addition, dual coating enhances the electrolyte uptake and wettability of a conventional polyethylene separator, which ensures improved power capability and stable cycle performance. The dual coating strategy via organic/inorganic hybridization is an easy and effective way to overcome the inherent disadvantages of conventional polyethylene separators and can be a practical approach to safer and higher capacity batteries.