

Short Communication

Membrane Separators Coated by TiO₂-PMMA with Low Thermal Shrinkage Rate for Lithium-Ion Batteries

Yangyang Xi, Peng Zhang, Haining Zhang, Zhaohui Wan, Wenmao Tu, Haolin Tang^{*}

State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, Wuhan, China, 430070

^{*}E-mail: thln@whut.edu.cn

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Composite membrane separators are fabricated by coating one side of microporous polyethylene membrane with poly(methyl methacrylate) modified titanate nanoparticles that are synthesized through emulsifier-free emulsion polymerization of methacrylate-functionalized titanate nanoparticles. The formed composite membrane separators exhibit great thermal-shrinking resistance due to the introduction of thermal resistant titanate nanoparticles. After immersed into electrolyte solution, the swelling poly(methyl methacrylate) microspheres leads to the formation of gel electrolyte, thus stabilizing the electrolyte. Moreover, the porous structure of the coated layer can facilitate the swelling of electrolyte and the transport of lithium ions. The thus-assembled lithium ion battery shows an improved cycle performance and rate capability.

Keywords: Lithium ion battery, composite membrane separator, titanate nanoparticles, surface modification, ionic conductivity

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