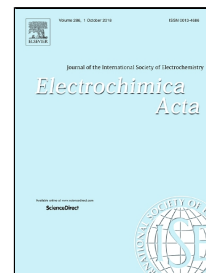


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# **A porous cross-linked gel polymer electrolyte separator for lithium-ion batteries prepared by using zinc oxide nanoparticle as a foaming agent and filler**

Luming Gu, Mingzu Zhang\*, Jinlin He, Peihong Ni

College of Chemistry, Chemical Engineering and Materials Science, State and Local Joint Engineering Laboratory for Novel Functional Polymeric Materials, Jiangsu Key Laboratory of Advanced Functional Polymer Design and Application, Soochow University, Suzhou 215123, China.

\* To whom correspondence should be addressed. E-mail: [zhangmingzu@suda.edu.cn](mailto:zhangmingzu@suda.edu.cn)

## **Abstract**

In this work, a new porous cross-linked membrane is prepared and used as the separator for rechargeable lithium-ion batteries. The inorganic zinc oxide nanoparticle (nano-ZnO) was added as a pore-forming agent and filler to the **preparation** process of membranes composed of poly(vinylidene fluoride-*co*-hexafluoropropylene) (PVdF-HFP) and a cross-linked polymer by the copolymerization from poly(ethylene glycol methyl ether methacrylate) (PEGMEMA), methyl methacrylate (MMA) and octavinyl-T8-silsesquioxane (OVPOSS). The prepared membrane was **firstly swollen** by propylene carbonate (PC) and nano-ZnO was then eluted by hydrochloric acid to form the microporous structure. The effects of particle size and additive amount of nano-ZnO on the mechanical and electrochemical properties of microporous **membranes were** studied. SEM analysis showed that 30 nm nano-ZnO **was** the most

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