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Electrospun PU@GO separators for advanced lithium ion batteries

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Abstract Recent developments in pliable electrode materials for lithium ion batteries (LIBs) have attracted much attention. However, flexible and robust separator with high ionic conductivity and thermal stability is also eagerly anticipated for advanced secondary batteries. Here porous polyurethane@graphene oxide (PU@GO) membranes prepared by electrospun technique have been developed as ideal separator candidates for high-performance LIBs. Electrolyte-uptake capacity and ionic conductivity of the flexible PU@GO separators are superior to those of commercial Celgard separators at 733% and 3.73mS·cm^{-1}, respectively, resulting in better battery performances in terms of impedance, specific discharge capacity and cycle life.

Keywords: PU@GO separator; electrospinning; ionic conductivity; flexibility; thermal stability

1. Introduction

The rapid development of portable electronics, wearable devices, and energy storage devices has triggered enormous research efforts toward developing flexible rechargeable batteries [1-4]. Among all the secondary batteries available, lithium ion batteries (LIBs) are the most preferred choice for the flexible electronic devices due to their high energy and long cycle life[5, 6]. Undoubtedly, people are most concerned about the electrode materials with outstanding electrochemical performances [7-9]. However, the separator in LIBs plays a key