

PEI-LTO-Graphene ternary nanocomposites for high performance lithium battery application

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Lithium titanate spinel ($\text{Li}_4\text{Ti}_5\text{O}_{12}$, LTO) is one of the most promising candidate as an anode material for advanced lithium ion batteries. Known as a zero-strain insertion oxide, it can undergo of thousands of cycles with little capacity loss. The storage capacity of lithium titanate has been improved by the preparation of nanocomposites with graphene or by surface modification leads to controlling the electrolyte diffusion for long cycle life. Recently, much attention has been paid for preparation of graphene LTO nanocomposites, low cost and high storage performance of graphene play an vital role to increasing the storage performance of LTO. The common problem in G-LTO is the aggregation of graphene sheets when reduction happened and it is detrimental to storage performance of nanocomposites. Herein, our finding is to solving the problem of aggregation by electrostatic interaction of PEI (Polyethylene imine) coated LTO and graphene sheets to produce graphene covered LTO nanocomposites. The electrochemical performance of LTO is found to be 178 mAh/g, in the case of nanocomposite (3.7 wt. %) achieved the capacity of as high as 190 mAh/g at 0.1 C.