Effects of Negative Electrodes Coated by ZnO with Different Morphologies on Electrochemical Performances and Safety of Lithium Ion Batteries

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To improve the safety of lithium-ion batteries, this study applied topographically different ZnO to the surface of negative graphite electrodes to serve as heat-resistant layers and explored the effects of these layers on a battery's electrochemical and safety features. The results indicate that when using a tetrapod ZnO (T-ZnO) particle coating as a heat-resistant layer on a negative graphite electrode, ion diffusion is improved because T-ZnO has a three-dimensional network structure and forms highly porous layers. This causes batteries to retain excellent electrochemical characteristics even if they contain inactive substances. Moreover, the results of overcharge and penetration tests were satisfactory, suggesting that the batteries are highly safe.

Keywords: Tetrapod ZnO; Rod ZnO; Negative electrode; Electrochemistry; Safety; Thermal stability; Li-ion battery.

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