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Construction of Conductive and Flexible Composite Cathodes for Room-temperature Solid-state Lithium Batteries

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ABSTRACT

Interfacial issues arising from the poor interface contact and poor interface stability between the stiff solid-state electrolytes (SSEs) and the electrodes have restricted the development of successful solid-state batteries (SSBs). Herein, we demonstrate that constructing flexible composite cathodes by introducing conductive frameworks consisting of succinionitrile and lithium salt significantly improves the contact performance and interface stability between garnet solid electrolyte and LiFePO₄ cathode, enabling the resulted SSBs cycling steadily with high capacity even at room temperature. The introduction of such flexible frameworks not only enables close contacts between the cathode and the stiff SSE, but also bridges every electrode and electrolyte particles together forming interconnected three-dimensional ionic conductive paths, reducing the total resistance to one-half of the batteries without such frameworks. On the other hand, the network is flexible enough to accommodate the volume change of LiFeO₄ during cycling. These advantages endow that the

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