

Electrochemical Devices for Energy Storage Applications

Cathode materials for sodium-ion-based energy storage batteries

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Abstract

The quest for mobile energy storage has revolutionized research in energy storage, especially in rechargeable batteries. Presently, lithium-ion batteries dominate the market. They are widely used in products ranging from consumer electronics to electric vehicles. The high cost and scarcity of lithium occasioned by high demand are driving research to develop alternatives to lithium-ion batteries. These alternatives became expedient to meet future needs in energy storage especially in expanding applications including batteries to store power from sources such as solar and wind energy for use on the power grid. The sodium-ion battery (SIB) is taking a centre stage in battery research because sodium resources are abundant in nature and is less expensive. Secondly, the electrochemical properties of SIBs are similar to that of a lithium-ion battery (LIB). Actually, studies in SIBs and LIBs started at almost the same time; however, investigation of SIBs was significantly reduced due to the success achieved in the commercialization of LIBs in the 1990s (Wang et al. 2018).