Graphene has emerged as one of the most interesting materials and finds extensive applications in fields such as batteries, electrochemical capacitors, and catalysts. Graphene, due to its high electrical conductivity, non-toxicity, and low molecular weight, appears to be one of the most promising active cathodes used in Leclanche cells and an electrode in electrochemical capacitors. In this Book, energy storage devices such as primary cells and metal air battery are investigated in order to enhance the electrochemical performance of the devices. Chemically and electrochemically derived graphenes (CG and EG) were synthesized to form manganese dioxide (α-MnO2)/graphene nano composite cathode material for zinc primary cell. Zinc–air (Zn–air) batteries possess high energy density due to surplus air involved in a reduction reaction at the air cathode are an important energy source used for automobiles and grid storage. This book explains, the scope of improvements in the efficiency ofZn-air batteries are investigated through the addition of water-soluble graphene (WSG) as a corrosion inhibitor in 1M KOH. Overall, the WSG-based Zn–air battery shows good self-discharge capacity

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