

ENHANCED ELECTROCHEMICAL PERFORMANCE OF SRI LANKAN GRAPHITE BY USING *PROPANE SULTON* ADDITIVE

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Lithium ion batteries (LIBs) have become the most important and popular energy source for portable electronic devices. LIBs mostly consist of graphite anode, and major reasons for using graphite are safety, thermal stability, low cost and high capacity. Sri Lankan natural graphites (SLNGs) have specific physical characteristics like high purity (99.9%), extensive mineralization and high crystallinity and have been previously tested for battery applications. Additives could be used to enhance the performance of SLNGs. Propane sulton additive was selected using computational calculations by analyzing highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbit (LUMO) energy levels. To test the validity of this assumption, first graphite samples were collected from Bogala and Kahatagaha and were crushed and milled. Then powder X-ray diffraction (PXR) patterns, thermal gravimetric analysis (TGA), Particle size analysis and scanning electron microscopic (SEM) images were taken to evaluate their physical and chemical properties. Electrochemical data were used to predict the capacity, capacity retention, cyclability, rate performance and coulombic efficiency of the graphite anode in 1.0 M LiPF₆ electrolyte with and without propane sulton additive. It was revealed that adding small amount of additives to the electrolyte could enhance the performance of SLNGs.