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Investigation of graphene loaded polypyrrole for lithium-ion battery

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Abstract:

The discredit state of lithium-ion (Ln) battery is as a result of the challenges associated with electrodes, inadequate power and energy densities. For a battery to be classified as suitable for electric vehicle and grid power suppliers, electrodes must be manufactured with the main aim of providing high power and high energy densities. Graphene (Gr) is a thin, single layer of graphite, whose electrical and mechanical properties can be easily re-orientated to obtain diverse applications. The re-orientation of the properties of graphene for electrode application, in this study, is achieved by its addition to a high conducting polymer, i.e. polypyrrole (Ppy) in the presence of Ln. This investigation was conducted by using density function theory to predict the power and energy densities of the electrode. The analysis of the investigation revealed that the composite of Gr/Ppy/Ln, is a promising battery electrode, which can deliver the required energy for electric vehicles.