Lithium Ion Battery Production using New Generation Nanomaterials by Electrospinning Method

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As a result of increasing energy need, technological devices must have improved batteries. Today, lithium-ion batteries wide spread fields of application with their high capacity and energy density as compared to other batteries. The latest studies have been focused on the usability of nanomaterials for the optimization of capacity of li-ion batteries. In our project we aimed to analyze the usability of new generation nanofibers within the cathodes of li-ion batteries. Polymer solutions prepared were transformed into nanofibers by electrospinning method. The polymers within the structure were removed by calcination. Nanofibers were mixed with the necessary connectors and half-cell li-ion coin cell production in the glovebox and was effectuated in accordance with the formation stages of li-ion coin cell. According to the material characterization processes conducted; it was proved by XRD that LiCoO2, LiCoO2/TiO2, Li2CoTi3O8 nanofiber materials were produced by electrospinning. Additionally, according to the results of SEM when the fiber diameters of the nanofibers are observed it was seen that the nanofibers having desired features have been produced and material production phase was completed with success. It is observed that electrochemical test results of li-ion batteries prepared by the produced nanofibers have reached the capacity values which can compete with the results of similar studies that have been reported in the technical literature. As a result, due to the mechanical stability of the produced nanofibers and because they increase crystallization, the utilization in li-ion batteries as a new generation material and putting in practice such material demonstrates the authenticity of the study.

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