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Development of a Quantification Software/Programme for Li-Mn-O Composite Nanoarchitectures

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The integrated layered-spinel manganese composites are the most desired cathode materials for lithium ion batteries due to their enhanced safety, inexpensive and non-toxic properties. They are preferred over Ni- and Co- containing compounds due to their greater stability (retention of the Oxygen) in their charged state. It has been reported that the spinel and layered integrated composites improve the electrochemical properties of lithium ion batteries, depending on the concentration of the layered Li₂MnO₃ component and spinel LiMn₂O₄ component. In this study, we develop a program aimed at quantifying the layered-spinel Li-Mn-O in the layered-spinel composite nanomaterials synthesized computationally using the amorphization and recrystallization technique. The program was developed using C# programming language and helps with better investigation of the impact associated with their respective quantities on the electrochemical performance of the cathode materials. The spinel content in the layered-spinel Li-Mn-O nanomaterial was found to be approximately 30 %. Capabilities of the program is to quantifying the amount of LiMn₂O₄ in layered-spinel Li-Mn-O composite nanomaterials which will add valuable insights to the design of such electrode materials associated with their performance.

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