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Characterization of Complex Spinel LiMn₂O₄ Nanosheet Simulated via Armorphization and Recrystallization Technique

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Abstract content (Max 300 words)
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Particle size reduction (mm to nm) is one of the strategies identified to shorten the electron and lithium ion diffusion paths in cathodes materials for lithium-ion batteries. Its implementation has resulted in enhanced rate capability, improved cycling stability and electrochemical performance of LiMn₂O₄ [1]. The armorphization and recrystallization technique is a practical tool to compliment annealing in experiments. It was previously employed to generate nano-architectures of binaries such as MnO₂ [2] and will be used in the current study on the spinel. Analysis of atomic crystal structures and microstructures of the resulting models, revealed presence of the spinel LiMn₂O₄ polymorph, rutile-MnO₂ and layered-Li₂MnO₃ in the nanosheet LiMn₂O₄. The highly defected structures revealed vacancies and comprise substitutions of Li and Mn in different layers, which suggest possible mechanisms for Li mobility. The calculated XRD compare favourably with measured XRD providing valuable insights of the atomistic models and supporting observations in microstructural features.

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yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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