

Exploring air exposure as a major pitfall in producing LiFePO₄

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Lithium ion batteries convert chemical energy into electrical energy and the process is reversible making them suitable for energy storage systems.(1) Having efficient and long term storage devices allows for increased use of sustainable energy sources. The cathode material remains the largest focus area for the improvement of the battery performance (2) and any structural changes of the cathode material can affect this performance. Lithium iron phosphate (LiFePO₄) forms part of the Pmna space group. All materials were synthesised using a hydrothermal methodology, using in-house developed Teflon bombs. Of interest were the effects due to different air exposure times, purging the sample with nitrogen before closing these teflon bombs and investigating the reproducibility of the synthetic method. The structural differences and phase purity due to these reaction variables were investigated; characterization techniques used include powder X-ray diffraction (PXRD) (coupled with Rietveld refinement analyses) and Mössbauer spectroscopy. The strong structure-property correlation that exists for these materials opens the door to future electrochemical measurements to be made.

REFERENCES:

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