

# Meningkatkan Performa LiFePO<sub>4</sub> dengan Penambahan Nickel Doping Menggunakan Metode Solid-State dan Prekursor Hematit Sebagai Half-Cell Lithium-Ion Baterai = Enhancing Performance of LiFePO<sub>4</sub> with Nickel Doping by Solid Synthesis Method with Hematite Precursor as Half-Cell Lithium-Ion Battery Cathode

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## Abstrak

Lithium Ferro Phosphate, LiFePO<sub>4</sub> (LFP) adalah kandidat yang menjanjikan sebagai bahan katoda baterai lithium ion. Dalam penelitian ini, LFNP/C disintesis dengan metode solid-state dari precursor LFP, Nickel menjadi variasi penambahan konten LFP dalam bentuk doping, yaitu, 6, 7,5 dan 9%, diberi label sampel LFNP/C-Ni6%, LFNP/C-Ni7.5% dan LFNP/C-Ni9%. Karakterisasi dilakukan menggunakan XRD, SEM, EDX, dan MAPPING. Ini dilakukan untuk mengamati efek penambahan Nickel pada struktur, morfologi, dan komposisi sampel. Hasil penelitian menunjukkan bahwa persentase optimum doping Nickel adalah 7.5% karena telah menunjukkan hasil yang memuaskan di performa CV, CD, dan EIS dengan ukuran kristal 76.93 nm. Dalam pengujian cyclic voltametry, konduktivitas dan kapasitas sampel meningkat dan disebabkan oleh penambahan Nickel pada LFP.

.....Lithium Ferro Phosphate, LiFePO<sub>4</sub> (LFP) is a promising candidate as a cathode material for lithium ion batteries. In this study, LFNP / C was synthesized by the solid-state method of the LFP precursors, Nickel became a variation of LFP content addition in the form of doping, namely, 6, 7.5 and 9%, labeled LFNP / C-Ni6% sample, LFNP / C-Ni7.5% and LFNP / C-Ni9%. Characterization was done using XRD, SEM, EDX, and MAPPING. This was done to observe the effect of adding Nickel to the structure, morphology, and composition of the sample. The results showed that the optimum percentage of Nickel doping was 7.5% because it had shown satisfactory results in the performance of CV, CD, and EIS with a crystal size of 76.93 nm. In cyclic voltametry testing, the conductivity and capacity of the sample increases and is caused by the addition of Nickel to LFP.