## ABSTRAK

Katoda $LiMn_{0,8}Fe_{0,2}PO_4/C$ dengan doping silikon dan dilapisi karbon menggunakan glukosa berhasil dilakukan melalui metode sol-gel. *X-Ray Diffraction* (XRD) menunjukkan bahwa fasa *olivine* terbentuk, dan analisis karakterisasi *Field Emission Scanning Electron Microscopy* (FESEM) menunjukkan rata-rata dimensi partikel katoda dalam orde kurang dari 100-300 nanometer. EDX menunjukkan bahwa setiap unsur penyusun utama tersebar merata. Berdasarkan analisis *Electrochemical Impedance Spectroscopy* (EIS), katoda $LiMn_{0,8}Fe_{0,2}PO_4/C$ memiliki resistansi kecil sebesar 146 Ω dan difusi ion lithium yang tinggi sebesar $6{,}05 \times 10^{-8}$ $S/cm^2$. *Cyclic Voltammetry* (CV) menunjukkan bahwa katoda $LiMn_{0,78}Fe_{0,2}Si_{0,02}PO_4/C$ mengalami mangan dissolution dan meningkatkan polarisasi. Uji *Charge-Discharge* (CD) memperoleh hasil katoda $LiMn_{0,78}Fe_{0,2}Si_{0,02}PO_4/C$ dengan kapasitas spesifik pelepasan awal sebelum *c-rate* 77 mAh/g lebih tinggi dibandingkan katoda $LiMn_{0,8}Fe_{0,2}PO_4/C$ sebesar 62 mAh/g, namun setelah uji *c-rate* katoda dengan doping Silikon mengalami penurunan kapasitas secara signifikan dan berbeda dengan katoda $LiMn_{0,8}Fe_{0,2}PO_4/C$ cenderung stabil. Hasil penelitian secara keseluruhan menunjukkan katoda $LiMn_{0,8}Fe_{0,2}PO_4/C$ memiliki nilai yang lebih baik.



Kata kunci: Baterai Lithium-ion, Katoda, $LiMnFePO_4/C$, Silikon, Sol-Gel.

## *ABSTRACT*

*Silicon-doped and carbon-coated $LiMn_{0,8}Fe_{0,2}PO_4/C$ cathode using glucose was successfully carried out via sol-gel method. X-Ray Diffraction (XRD) showed that olivine phase was formed, and Field Emission Scanning Electron Microscopy (FESEM) characterization analysis showed the average particle dimensions of the cathode were in the order of less than 100-300 nanometers. EDX shows that each main constituent element is evenly distributed. Based on Electrochemical Impedance Spectroscopy (EIS) analysis, the $LiMn_{0,8}Fe_{0,2}PO_4/C$ cathode has a small resistance of 146 Ω and high lithium ion diffusion of 6.05 × 10^(-8) S/cm2. Cyclic Voltammetry (CV) showed that the $LiMn_{0,78}Fe_{0,2}Si_{0,02}PO_4/C$ cathode underwent manganese dissolution and increased polarization. Charge-Discharge (CD) test obtained the results of $LiMn_{0,78}Fe_{0,2}Si_{0,02}PO_4/C$ cathode with initial discharge specific capacity before c-rate of 77 mAh/g higher than $LiMn_{0,8}Fe_{0,2}PO_4/C$ cathode of 62 mAh/g, but after c-rate test the cathode with Silicon doping significantly decreased capacity and in contrast to $LiMn_{0,8}Fe_{0,2}PO_4/C$ cathode tends to be stable. The overall results show that $LiMn_{0,8}Fe_{0,2}PO_4/C$ cathode has a better value.*



***Keywords**: Lithium-ion battery, cathode, $LiMnFePO_4/C$, Silicon, Sol-Gel.*