Penggunaan karbon dari arang sekam padi dalam sintesis LiFePO4/V/C sebagai katoda baterai lithium ion = Use of carbon from rice husk in the synthesis of LiFePO4/V/C for lithium ion battery cathode

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Abstrak

Proses sintesis LiFePO 4/V/C dilakukan untuk membuat katoda baterai lithium ion. Sintesis diawali dengan membuat LiFePO4 melalui proses hidrotermal dengan bahan dasar LiOH, NH4H2PO4, dan FeSO4.7H2O. Setelah proses sintesis, LFP kemudian ditambahkan variasi vanadium dan karbon aktif sekam padi. Ketiga bahan dicampur menggunakan ball-miller kemudian dikarakterisasi analisis termal STA untuk menetukan temperatur sintering. Proses sintering dilakukan pada temperatur 850 C selama 4 jam. Hasil sintering kemudian dikarakterisasi dengan difraksi sinar-X XRD dan morfologi permukaan dianalisa dengan menggunakan mikroskop elektron SEM.
Hasil karakterisasi dengan XRD menunjukkan terbentuknya fasa LiFePO4/V/C. Hasil SEM menunjukkan perbedaan morfologi penambahan vanadium dan karbon aktif. Proses pembuatan baterai dilakukan dengan bahan-bahan hasil sintesis. Pengujian konduktifitas dilakukan dengan menggunakan EIS. Hasil EIS menunjukkan bahwa dengan penambahan karbon aktif sekam padi memiliki konduktifitas yang lebih besar dibandingkan karbon gula dan carbon black. Hasilnya yaitu karbon aktif sekam padi dapat digunakan sebagai pelapis karbon pada katoda baterai lithium ion.
.....Use of carbon pyrolized from rice husk in the synthesis of LiFePO4 V C used as lithoum ion battery cathode has been carried out. The synthesis was begun by syntesizing LiFePO4 LFP via hydrothermal route using the precursors of LiOH, NH4H2PO4, and FeSO4.7H2O. The as synthesized LFP was then added with variations of vanadium and a fix composition of activated carbon using rice husk as the resource of the carbon. These three ingredients were mixed using a ball miller and was characterized using thermal analyzer to determine the transition temperature from which temperature 850 C was obtained. The LiFePO4 V C was characterized using X ray diffraction XRD whereas the surface morphology was analyzed using scanning electron microscope SEM equipped with energy dispersive X ray spectroscopy EDX.
XRD results show that the LiFePO4 V C has been formed, whereas SEM results showed a difference in morphology of vanadium and activated carbon addition. The battery were prepared from the as synthesized materials and was tested using electrical impendance spectroscopy EIS. EIS results showed that the materials with addition of activated carbon from the rice husk has greater conductivity than that of pure LFP. This prove that the activated carbon from the rice husk can be used as a cheap carbon resource for developing lithium ion battery cathode.