

**THE EFFECTS OF POLIVINYL ALCOHOL (PVA)
CONCENTRATION ON ELECTROCHEMICAL
PERFORMANCE $\text{LiTi}_2(\text{PO}_4)_3$ BY SOL-GEL PROCESS AS
ANODE FOR LITHIUM ION BATTERY TYPE AQUEOUS
ELECTROLYTE**

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Abstract

The development of research on lithium ion battery as energy storage system is very rapidly. In lithium ion battery, one of the main part composed as anode by the material $\text{LiTi}_2(\text{PO}_4)_3$. So, this research aimed to determine the effect of the concentration of polyvinyl alcohol (PVA) on the electrochemical performance $\text{LiTi}_2(\text{PO}_4)_3$ as an anode of lithium ion battery. The synthesis process of $\text{LiTi}_2(\text{PO}_4)_3$ conducted by sol-gel process that using Li_2CO_3 , TiO_2 , $\text{NH}_4\text{H}_2\text{PO}_4$, and variations in concentrations of 5 wt%, 10 wt%, 15 wt% polyvinyl alcohol (PVA). In the XRD testing of three samples, identified $\text{LiTi}_2(\text{PO}_4)_3$ according to JCPDF 35-074 although there is still other phase in a small intensity. The SEM test showed the material $\text{LiTi}_2(\text{PO}_4)_3$ 5wt.% PVA have particles size smaller than the other variations. However, the particle size is not homogeny and there is still little agglomeration due to the calcination process at high temperature. The electrochemical performance test of Cyclic Voltammetry (CV) showed that anode $\text{LiTi}_2(\text{PO}_4)_3$ 5wt.% PVA showed high ion kinetic values, because at the anode has the smallest particle size compared to the other,

increasing the Li^+ ion diffusivity. The Charge-Discharge Galvanostat testing showed that the anode $\text{LiTi}_2(\text{PO}_4)_3$ 5wt.% PVA has better stability because the anode $\text{LiTi}_2(\text{PO}_4)_3$ 5wt.% PVA has a particle size distribution smaller, so that the transfer of ions during the process of intercalation/de-intercalation can take place in a stable.

Keywords: $(\text{LiTi}_2(\text{PO}_4)_3)$, Polivinil Alcohol (PVA), Sol-gel, Electrochemical Performance.