Substitution silicon on phosphorus in $LIFePO_4$ to improve the performance of cathode active material

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Abstract

In this experiment $LiFePO_4$ as cathode material for lithium battery was modified with silicon substitution to combine $LiFePO_4$ and Li_2FeSiO_4 characters. $LiFePO_4$ is expected to increase its performance. Modify LiFePO4 to $LiFeP_{1-x}Si_xO_4$ was done with variation x = 0; 0.05; 0.1 and 0.2. The preparation was carried out by solid state reaction method, ie calcination 700^0C for 2 hours and sintering 900^0C for 6 hours in inert gas nitrogen. Then this material is coated carbon with acetic acid as carbon source at 700^0C for 20 min in inert gas nitrogen. Structural observations were performed with XRD, FTIR, SEM and TEM. Electrochemical testing was performed with cyclic voltameter and charge discharge.

Keywords: cathode, lithium battery, $LiFePO_4$, Li_2FeSiO_4, solid state reaction.

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