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Quantitative Study of Na⁺ and/or Cl⁻ doped LiFePO₄ as a Cathode Material for Li-Ion Batteries MICHAEL SEMMLINGER, SPS at Sam Houston State University, HUI FANG, Sam Houston State University Physics Department — In light of the growing need for high performance batteries, Li-Ion cells with phospho-olivine cathode materials have received much attention. The overall goal of this research project is to improve the cathode material of lithium ion batteries, by doping lithium iron phosphate (LiFePO₄) with sodium (Na⁺) and/or chloride (Cl⁻) ions. The objective is to quantitatively study the effects of Na⁺-Cl⁻ doping on the electrochemical properties of LiFePO₄ in order to find the most effective doping amounts. Therefore, several Na⁺, and Cl⁻ doped samples, as well as Na⁺-Cl⁻ co-doped samples, and a non-doped LiFePO₄ sample for comparison purposes, were prepared using a solid-state reaction. All samples were subsequently carbon coated. After preparation, the sample powders were tested using an X-ray diffractometer to give indication about the containing chemical compounds, as well as impurities. In order to measure the performance of the achieved cathode material, several cathodes were prepared from each sample, and then placed into button batteries. The subsequent testing of the batteries using an Arbin BT2000 battery testing system has been rendering data including the cell voltage, cell capacity, and conductivity.

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