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**Role of Ce and In doping in the performance of LiFePO<sub>4</sub> cathode material for Li ion Batteries** BALAJI MANDAL, MARIAM NAZRI, Wayne State University, PREM P. VAISHNAVA, Kettering University, VAMAN M. NAIK, University of Michigan-Dearborn, GHOLAM A. NAZRI, RATNA NAIK, Wayne State University — Recently, the olivine LiFePO<sub>4</sub> has attracted attention as a promising cathode material for Li ion batteries. However, its poor electronic conductivity is a major challenge for its industrial applications. Different approaches have been taken to address this problem. Here, we report a method of improving its conductivity by doping In and Ce ions at the Fe site. We prepared the samples by sol-gel method followed by annealing at 650 °C in Ar (95%) +H<sub>2</sub>(5%) atmosphere for 5 hrs. XRD and Raman spectroscopy confirm that the olivine structure remains unchanged upon doping with In and Ce up to 5 wt%. XRD analysis shows the values of the lattice parameters increase with doping as the ionic radii of Ce and In ions are larger than that of the Fe<sup>2+</sup> ion. This observation also suggests that both Ce and In ions replace Fe ions and not the Li ions in the material. Upon doping, ionic conductivity was found to increase from 10<sup>-9</sup> to 10<sup>-4</sup> Ohm<sup>-1</sup>cm<sup>-1</sup>. Interestingly, Ce doped LiFePO<sub>4</sub> showed a higher conductivity than In doped LiFePO<sub>4</sub>. SEM measurements show a bigger grain size of ~300-500 nm in doped LiFePO<sub>4</sub> which decreased to ~50 nm when the materials were synthesized using 0.25M lauric acid as a precursor. The electrochemical characteristics of the doped LiFePO<sub>4</sub> along with conductivity and Raman data will be presented.

- Prefer Oral Session  
 Prefer Poster Session

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