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Surface modification of $LiMn_{2-x}Fe_xO_4$ cathode materials with ZnO AMIR OMIDWAR, SAM CHIOVOLONI, RAHUL SINGHAL, PETER LEMAIRE, Central Connecticut State University — We have successfully optimized the conditions for the synthesis of $LiMn_{2-x}Fe_xO_4$ cathode materials for Li ion rechargeable batteries. We obtained the optimum calcinations temperatures for $LiMn_2O_4$, $LiMn_{1.75}Fe_{0.25}O_4$, and $LiMn_{1.5}Fe_{0.5}O_4$ as 850°C, 750°C, and 750°C, respectively. It has been reported in the literature that cycleability of $LiMn_2O_4$ cathode materials can be improved by surface modification of $LiMn_2O_4$ cathode materials with ZnO. In the present studies we have coated $LiMn_{2-x}Fe_xO_4$ cathode materials with 2% ZnO. The coating of ZnO onto $LiMn_{2-x}Fe_xO_4$ were performed using zinc acetate as precursor materials. Appropriate quantity of zinc acetate was first dissolved in ethanol. Upon complete dissolution of zinc acetate in ethanol, required quantity of $LiMn_{2-x}Fe_xO_4$ cathode material was poured in this solution, followed by continuous stirring for 4 hrs. The solution was then dried in an oven in air atmosphere. The physical characterization of the ZnO coated $LiMn_{2-x}Fe_xO_4$ cathode materials were carried out using X-ray diffraction, differential scanning calorimetry (DSC) and thermo-gravimetric analysis (TGA). The detailed results of our investigation will be presented during the meeting.

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