The effect of Mg and F co-doping on electrochemical performance of Li-rich cathode material

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Recently, the xLi2MnO3·(1-x)LiMO2 (M = Ni, Co, Mn) cathode materials have been attracted interest as promising cathode materials due to their advantages compared to conventional cathode materials. However, these cathode materials face some challenges for application to HEVs and EVs because of their poor rate capability and cycle performance. Many groups have been made every effort to improve the electrochemical performance using various ways such as surface modification, designing particle shape. However, these ways require complex process and is hard to be scaled up. On the contrary the partial substitution easily enhances electrochemical performance without additional processing step.

In the present work, the Mg and F co-doped layered composite cathode material, formulated as Li1.167Mn0.548-xMgxNi0.18Co0.105O2-yFy (x = 0, 0.02 and/or y = 0, 0.02), was synthesized using spray pyrolysis and investigated the synergy effect of co-doping. In addition, we analyzed the oxidation state of components of powders to understand effect of each dopant on electrochemical performance.