# A modified mechanical synthesis for Mg-doped $LiFePO_4$ in lithium batteries

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Recently, $LiFePO_4$ has drawn much attention as a promising cathode active material for lithium ion batteries. $LiFePO_4$ is inexpensive, safe, environmental friendly, and the synthetic routes have been well established. However, the low electronic conductivity and low lithium ion diffusion of $LiFePO_4$ greatly hinders its further development. In this study, the enhancement of the electrochemical properties of $LiFePO_4$ has been carried out using different synthetic parameters such as different ball-milling time, magnesium doping (0.3%) and carbon coating(0, 3, 5%).