Polyol mediated synthesis and electrochemical performance of nanostructured LiMn_2O_4 cathodes

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Nanoparticulate single phase LiMn_2O_4 spinel was prepared via polyol method and applied as a cathode in a lithium ion battery. The effects of calcination temperature (250 °C – 800 °C) as well as of post-synthetic treatment by ball milling on the physiochemical and electrochemical properties of LiMn_2O_4 were studied by means of powder XRD, SEM, cyclic voltammetry and charge/discharge cycling. With increasing calcination temperature, the electrochemical activity and discharge capacity increased. The measurements revealed that the electrochemical performance of LiMn_2O_4 can be further improved by ball milling before calcination. Furthermore, the ball milling process allowed reducing the calcination temperature needed to obtain electrochemically active material.

Keywords: Lithium ion battery, LiMn_2O_4 spinel, nanoparticles, calcination, ball milling

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