Polyol mediated synthesis and electrochemical performance of nanostructured LiMn$_2$O$_4$ cathodes

Shuo Yang$^1$, Melanie Homberger$^{1,2}$, Michael Noyong$^{1,2}$, Ulrich Simon$^{1,2,*}$

$^1$ Institute of Inorganic Chemistry, RWTH Aachen University, Landoltweg 1, 52074 Aachen, Germany
$^2$ JARA-FIT, 52056 Aachen, Germany.

*E-mail: ulrich.simon@ac.rwth-aachen.de

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Nanoparticulate single phase LiMn$_2$O$_4$ 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$_2$O$_4$ 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$_2$O$_4$ 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$_2$O$_4$ spinel, nanoparticles, calcination, ball milling

FULL TEXT

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