CHARGE DISCHARGE CHARACTERISTICS OF NORMAL AND NANO $LiNi_{1-X}Co_XO_2$

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Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of the Bachelor of Science (Hons.) Physics
in the Faculty of Applied Sciences
Universiti Teknologi MARA

MAY 2011

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Date: 18 MAY 2011

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ABSTRACT

CHARGE DISCHARGE CHARACTERISTICS OF NORMAL AND NANO $LiNi_{1-x}Co_xO_2$

Lithium nickel cobalt oxide ($LiNi_{1-x}Co_xO_2$) issued a high capacity method material in the fabrication of a bi-cell type of lithium ion polymer battery (LIPB). The capacity and cycle performance of the battery is evaluated from the charge discharge characteristics. $LiNi_{0.7}Co_{0.3}O_2$ prepared via Ball Milling (BM) by annealing temperature for 3 hours is displays a higher initial discharges capacity (180mAh/g) than the $LiNi_{0.7}Co_{0.3}O_2$ for 12 hours .The charges – discharge characteristics and performance of the battery at the room temperature are evaluated to ascertain the effective viability. The value of capacity depend on the sample. When increased the cobalt, the capacity is decreased. The electrochemical analysis reveal that the discharge capacity of $LiNi_{1-x}Co_xO_2$ significantly depends on the particle size. The relation between structural and electrochemical properties used in advanced rechargeable lithium battery.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Lithium cobalt oxide ($LiCoO_2$) is one of the most importance cathode used in lithium – ion secondary batteries. $LiCoO_2$ can be prepared by various methods using different lithium and cobalt sources (M.G.S.C et al,.1985;G. G. Amatucci et al.,1996; Y.M Chang et al,.1998). As all lithium ions are extracted from the host structure of $LiCoO_2$, irreversible phases transformation will occur to result in inferior cycle ability. When only 50% of the lithium ions are extracted during cycling, $LiCoO_2$ can maintain good cyclic stability. (E. Plichta et al.,1989)

In recent years, synthesis of nanoparticles has been intensively investigated. Powder prepared by the traditional solid- state reaction have large particle size and broad size distribution. On other hand, solution method can reduce the particle size to nanometer range and control the particle size distribution. Different kinds of solution methods such as the sol – gel process (X. Qiu et al.,1997) , the hydrothermal process (V. Jayaraman et al.,1997) and the emulsion process have been utilized to synthesized the nanoparticles.

In lithium – ion batteries, cathodes material have great influence on the electrochemical performance. According to the (Chung-Hsin Lu *et al.*,2003) a newly development microemulsion process is utilized to synthesize $LiCoO_2$ powders. The effect of the salinity in the aqueous phase and the heating condition