

論文 / 著書情報
Article / Book Information

題目(和文)	
Title(English)	High-pressure synthesis, electrochemical properties and structural characterization of Li rich cathode materials with a layered rock salt structure
著者(和文)	Chang Hansen
Author(English)	Hansen Chang
出典(和文)	学位:博士(理学), 学位授与機関:東京工業大学, 報告番号:甲第9413号, 授与年月日:2014年3月26日, 学位の種別:課程博士, 審査員:菅野 了次,平山 雅章,大坂 武男,川路 均,松下 伸広,中村 二郎
Citation(English)	Degree:Doctor (Science), Conferring organization: Tokyo Institute of Technology, Report number:甲第9413号, Conferred date:2014/3/26, Degree Type:Course doctor, Examiner:,,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	要約
Type(English)	Outline

(博士課程)
Doctoral Program

THESIS OUTLINE

専攻 : Department of	総合理工学	専攻	申請学位 (専攻分野) : Academic Degree Requested	博士 Doctor of	(Science)
学籍番号 : Student ID Number	11D27067		指導教員 (主) : Academic Advisor(main)	Prof. Ryoji Kanno	
学生氏名 : Student's Name	Hansen Chang		指導教員 (副) : Academic Advisor(sub)	Dr. Hirayama Masaaki	

論文題目 Thesis Title	High-pressure synthesis, electrochemical properties and structural characterization of Li rich cathode materials with a layered rock salt structure
----------------------	---

Lithium rich layered rock-salt type compounds are promising candidates for the next generation of lithium battery cathodes, however their mechanism and structure during electrochemical cycling are poorly understood. $\text{Li}_{1+x}[\text{Li}_{0.2}\text{Mn}_x\text{Co}_{0.6-x}\text{Ni}_{0.2}]\text{O}_2$ ($0 \leq x \leq 0.6$) were synthesized under different oxygen pressures using a high pressure method to investigate excess lithium effects and their phase relationship and electrochemical properties. X-ray and neutron Rietveld analyses showed that excess lithium was successfully introduced into the layered structure and X-ray absorption spectroscopy clarified change in valence of transition metals under varying oxygen pressure conditions. Charge/discharge measurements revealed that the lithium excess phases were electrochemically activated at the initial charge/discharge process and delivered high discharge capacities of over 200 mAh g⁻¹ at the subsequent cycles. Understanding excess lithium content in relationship to the phase could be a key factor for practical use of high performances batteries that employ lithium-rich layered electrodes.