Efek pembebanan dan temperatur terhadap Kristalografi LiCoO2 = imposition and temperature effect to Crystallography of LiCoO2

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Abstrak

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Untuk meningkatkan kemampuan baterai sekunder, pemahaman mengenai bahan elektroda dan elektrolit harus ditingkatkan. Bahan elektroda negatif yang banyak digunakan adalah grafit, sedangkan elektroda positif yang banyak digunakan adalah LiCoO2. Pada penelitian ini dilakukan pengamatan mikrostruktur LiCoO2 komersial. Pada LiCoO2 diberikan pembebanan(5, 10 dan 15 GPa), pemanasan (60oC, 150oC, dan 200oC) dan pemanasan secara in situ (25, 60, 70, 75, 80, 90, 100 dan 115oC) yang selanjutnya dilakukan pengujian kristalografi menggunakan teknik difraksi sinar-x. Selanjutnya dilakukan refinement terhadap data hasil difraksi sinar-x menggunakan GSAS-EXPGUI. Dari hasil refinement diperoleh data perubahan parameter kisi, occupancy, dan density. Nilai occupancy, dan density semakin menurun dengan meningkatnya nilai pembebanan dan meningkatnya suhu pemanasan. Pada penelitian ini juga teramati adanya prefered orientation pada bidang (003) dan delithiasi yang ditandai dengan penurunan nilai occupancy Li akibat pembebanan dan pemanasan.
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ABSTRACT
In order to increase the secondary battery?s ability, the understanding of electrode and electrolit has to be improved. The negative electrode material which is commonly used is grafit, as for the positive electrode, it is LiCoO2. In this research, microstructure LiCoO2 commercial observation will be done. On LiCoO2, imposition (5,10 and 15 GPa), heating (60oC, 150oC, and 200oC), and heating with in situ (25, 60, 70, 75, 80, 90, 100 and 115oC) are given, and then crystallography using x-ray diffraction technique is tested. Next, refinement to the data of x-ray diffraction result is done by using GSAS-EXPGUI. The data of grid parameter, occupancy, and density are obtained from the result of refinement. The rate of occupancy and density become lower as the imposition?s rate and the heating temperature increase. In this research, there are also prefered orientation on field (003) and delithiasi which are marked with the decreasing of occupancy Li rate due to the imposition and heating., In order to increase the secondary battery’s ability, the understanding of
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