

課題番号 : F-21-WS-0147
利用形態 : 機器利用
利用課題名(日本語) :
Program Title (English) : In-situ Raman analysis of zinc dissolution-passivation behavior
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1. 概要(Summary)

Zinc battery is considered to be the promising energy supply. However, the passivation of zinc electrode directly leads to the performance fading. Hence, figuring out the dissolution-passivation behavior of zinc electrode is essential to the optimization of zinc batteries. Raman measurement is well-known as the sensitive but nondestructive way of surface analysis, which is effective for the zinc electrode analysis as it can be in-situ conducted during the anodic polarization. Accordingly, our research work on zinc electrodes is mainly based on the in-situ Raman spectroscopy analysis.

2. 実験(Experimental)

【利用した主な装置】

- ・顕微ラマン分光装置
- ・インラインモニター用 超高分解能電界放出型 走査電子顕微鏡 (SU8240)
- ・CCD カメラ

【実験方法】

The main work is conducting in-situ Raman analysis on the cross-section of zinc electrode during anodic polarization to see how the crystallinity of zinc changes through its dissolution until the final passivation. Other in-situ observations using the optical microscope are also applied to reveal the color change of zinc electrode, which could also reveal the existence of disorder within the zinc electrode. In addition, we also check

the morphology change of zinc electrode surface at different time period through the anodic polarization via SEM.

3. 結果と考察(Results and Discussion)

The formation of zinc oxide with different crystallinity is observed through in-situ Raman measurements. The existence of different types of zinc oxide is further confirmed by the color change revealed via in-situ optical observations. Combining with the electrochemical performance of zinc electrode during the anodic polarization, a systematic understanding and illustration of zinc dissolution-passivation behavior is achieved in this work.

4. その他・特記事項(Others)

なし.

5. 論文・学会発表(Publication/Presentation)

なし.

6. 関連特許(Patent)

なし.