

XANES Investigation of the MnO_2 with Potassium Polyacrylate – Based Gel Polymer Electrolyte

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In this work, X-ray absorption near-edge structures (XANES) spectroscopy was used to investigate the valence states of Mn in the oxide with liquid and gel polymer electrolytes by using the in – situ method. We found the capacitance of MnO_2 will be enhanced in the polyacrylate – baed gel polymer electrolytes compared with the aqueous electrolyte. The results is in the Fig. 1.

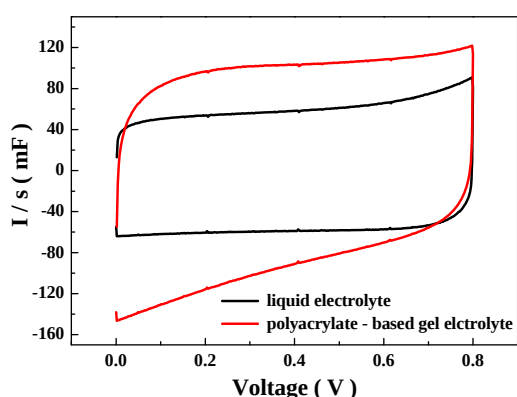


Fig. 1: Cyclic voltammograms of MnO_2 with liquid and polacrylate – based gel polymer electrolytes.

For realizing the chemical state change of MnO_2 with liquid and gel polymer electrolytes, the in – situ XANES investigation upon cycling was employed. The results is in Fig. 2.

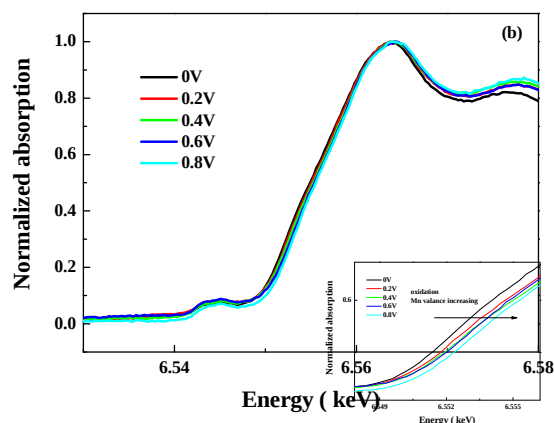
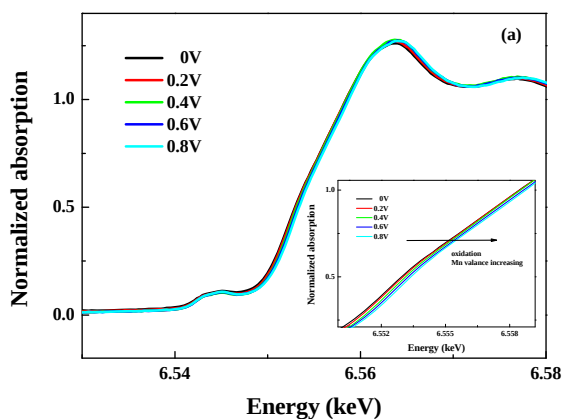


Fig. 2: In –situ XANES of MnO_2 with (a) liquid and (b) gel polymer electrolytes.

After calculating, the comparison of XANES of different electrolytes is shown in Fig. 3.

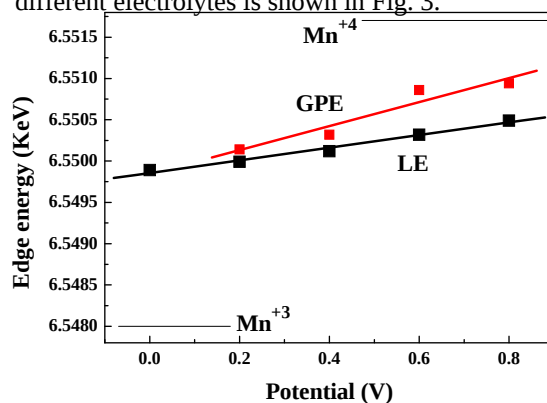


Fig. 3: Comparison of Mn – K edge of MnO_2 with liquid (LE) and gel polymer (GPE) electrolytes.

References

- [1] K. T. Lee and N. L. Wu, J. Power Sources **179**, 430 (2008).
- [2] K. T. Lee, J. F. Lee, and N. L. Wu, Electrochim. Acta **54**, 6148 (2009).