

Supporting information

Electrochemical Activity of alpha-MoO₃ nano-belts, as Lithium-ion battery Cathode

Uttam Kumar Sen^a and Sagar Mitra^{*a}

Electrochemical Energy Laboratory, Department of Energy Science and Engineering, IIT Bombay, Mumbai-400076, India Fax+91 22 2576 4890; Tel: +91 22 2576 7849; E-mail: sagar.mitra@iitb.ac.in.

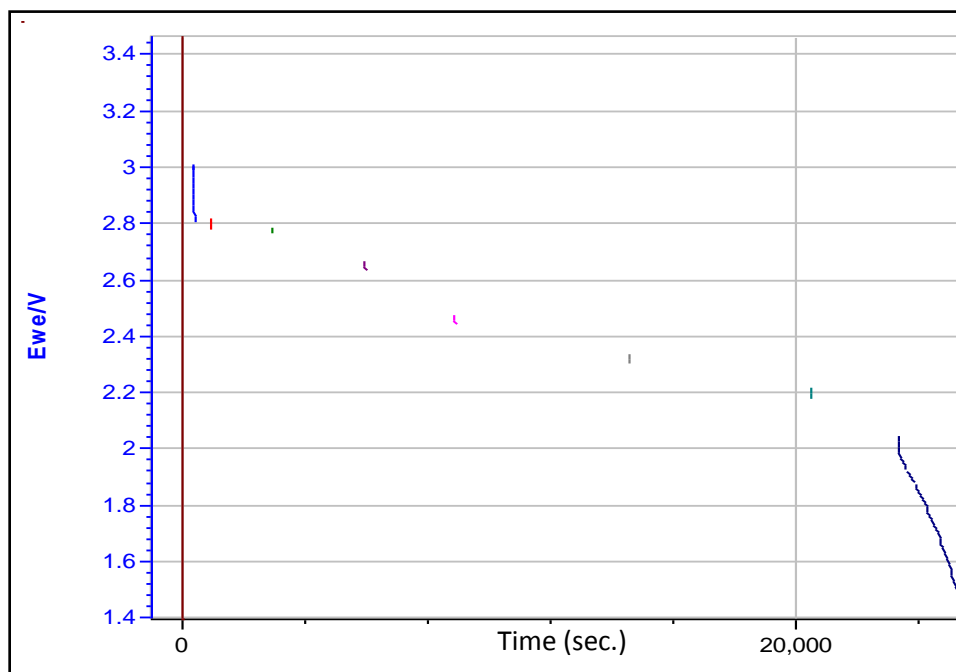


Fig.- S1 : First discharge curve with nine points where in-situ impedance were taken.

The *in-situ* experiment was carried out in the Bio-logic VMP-3 instrument. For better result the cell was discharged at slower rate of 50 mA g⁻¹. First a cell was prepared by SS supported α -MoO₃ and discharged at 50 mA g⁻¹ and the potential points were identified. First point was OCV (here it is 3.0 V) and the 2nd point was taken at the beginning of the 1st plateau which was 2.8 V, 3rd and 4th point were taken at the middle (2.76 V) and at the end (2.65) of the 1st plateau respectively. Similarly 5th and 6th points are selected at the beginning (2.45 V) and at the middle (2.30 V) of the 2nd plateau. The points at the beginning and at the middle of the sloppy region

were considered as 7th (2.18 V) and 8th point (2.0 V). Finally 9th point was taken at the end of the discharge process i.e. at 1.51 V. After the points were identified another cell of same electrode (with similar area and active weight) was run at same current rate and the discharge profile was programmed like described below. The discharge process was stopped at the programmed point and the impedance measurements were done immediately (automatically). As soon as the impedance measurement gets over, the cell was resumed from the same potential. During this *in-situ* experiment the cell was never disconnected from the circuit. Fig.-S1 shows the discharge profile (potential vs. time) with programmed points. As shown in the figure, the discharge process was stopped at the programmed potential and the impedance was taken. A discontinuity in the potential vs. time curve indicates the points where impedance were taken and the gap in the time axis measures the time taken of impedance measurement. A minute fluctuation in voltage was observed after each impedance, but the value of this fluctuation was extremely small ~ 0.04 V.

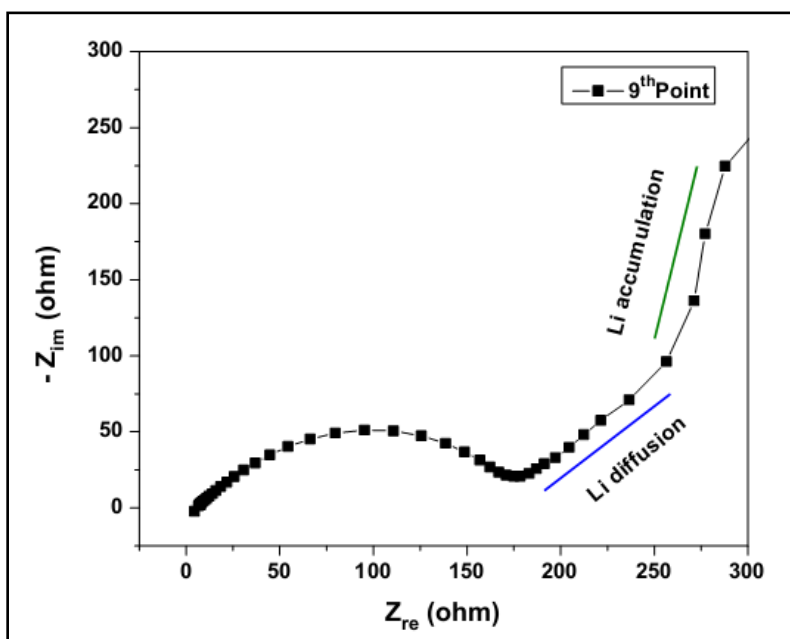


Figure-S2: Representative illustration of Li diffusion and Li accumulation for EIS at point -9