

## **Work Carried out in Advanced Batteries Lab, National University of Singapore, Singapore**

The energy crisis of the world today is being mitigated by several ways. One such is lithium ion batteries which is reusable i.e. it can be charged and discharged (secondary batteries). From the time of its inception in 1991, these batteries have come a long way and still there are scope of improvisation and development.

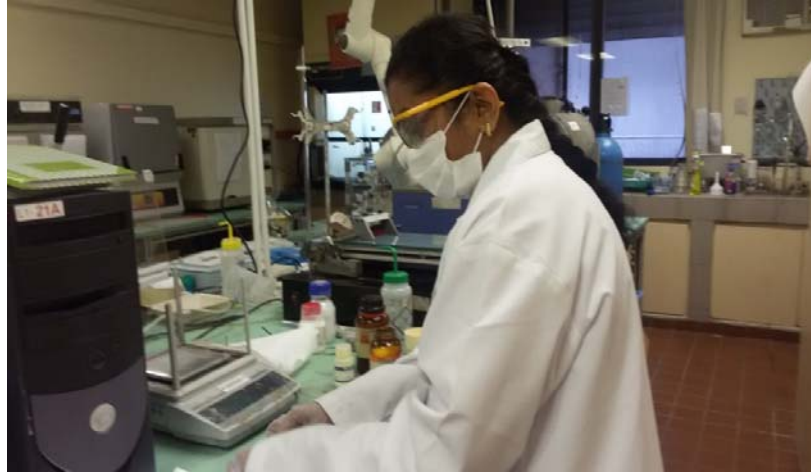
With this objective in mind, many electrode (prepared at CNMS, Jain University and at Advanced Batteries Lab, Singapore) materials were prepared.

The materials prepared were made into electrodes and characterized electrochemically.

### **Preparation of Slurry**



## 2. Coating of Slurry



## 3. Drying of the electrode

## 4. Cutting of the electrodes



## 5. Fabrication of the coin cell 2016



The so-prepared coin cells were taken out of the glove box, cleaned with acetone to remove any electrolyte that could have seeped outside the cell, numbered and the open circuit voltage of the cell to test proper assembling.

These cells were used

1. to test the charge-discharge cycling,
2. for cyclic voltammeter studies
3. for electrochemical impedance studies.

The electrodes that were tested are:

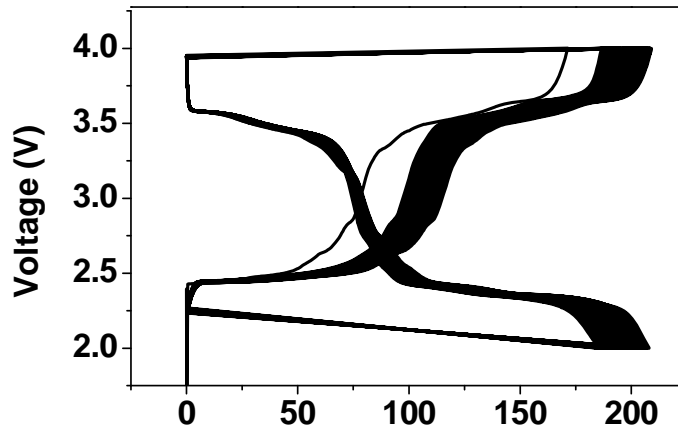
1. Vanadium pentoxide - cathode
2. Titanium dioxide in presence of nickel - anode

### 3. Titanium dioxide in presence of lithium - anode

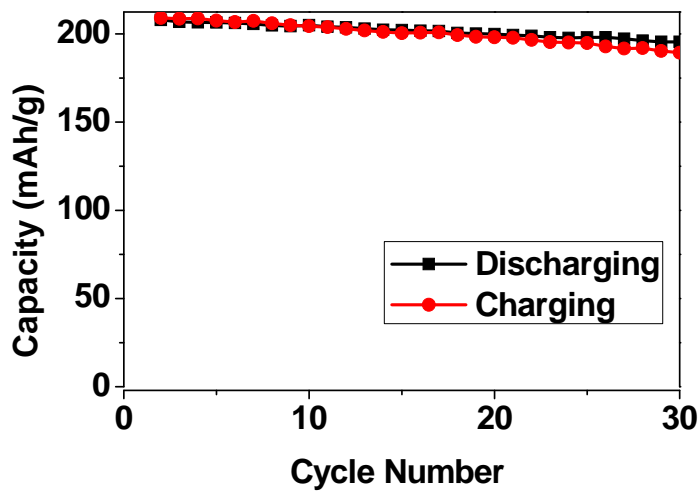
The results are:

- **Vanadium pentoxide**

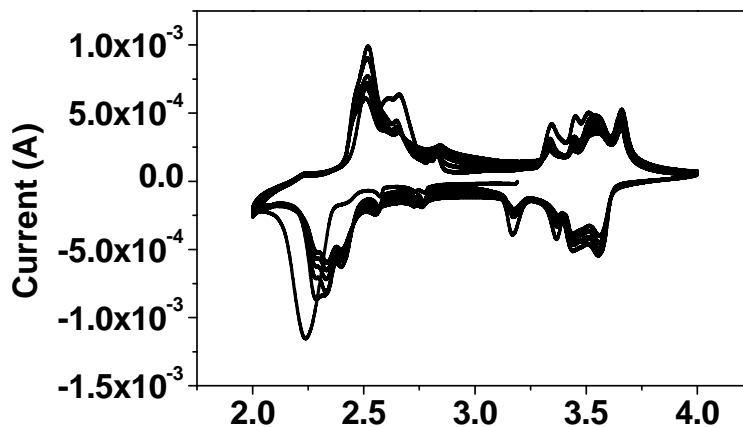
#### 1. Charge - Discharge cycling



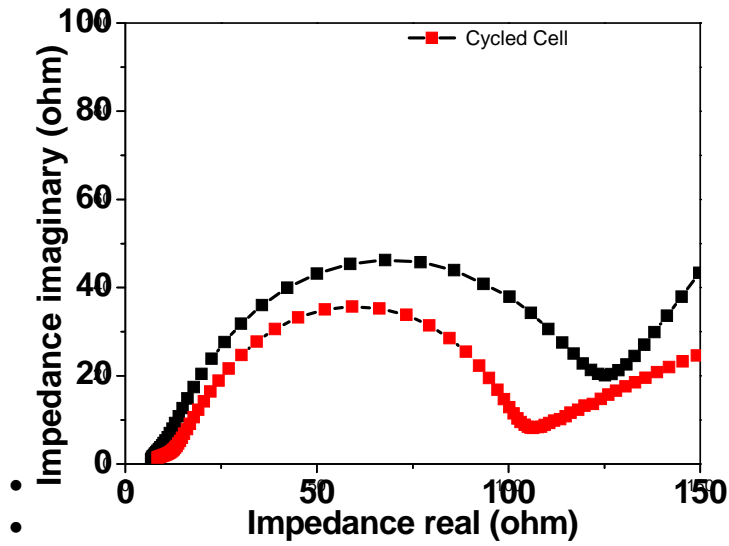
#### 2. Cycle number Vs Capacity



#### 3. Cyclic Voltammogram

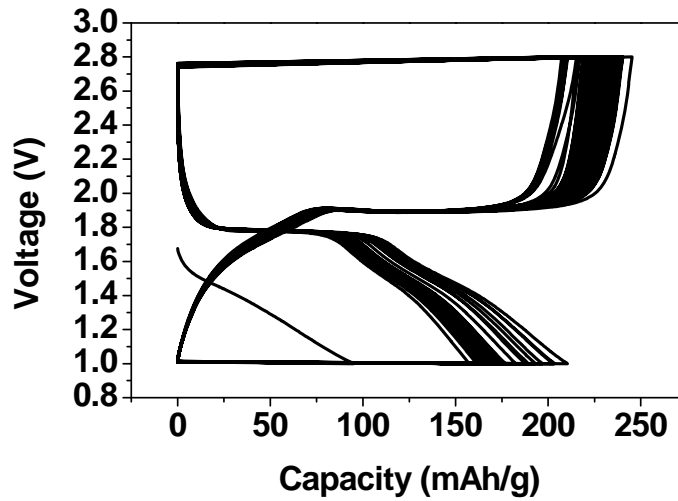


#### 4. Electrochemical impedance spectra

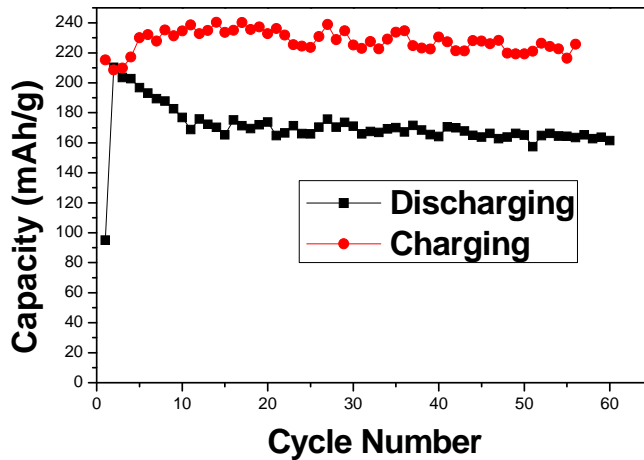


• Titanium dioxide with nickel

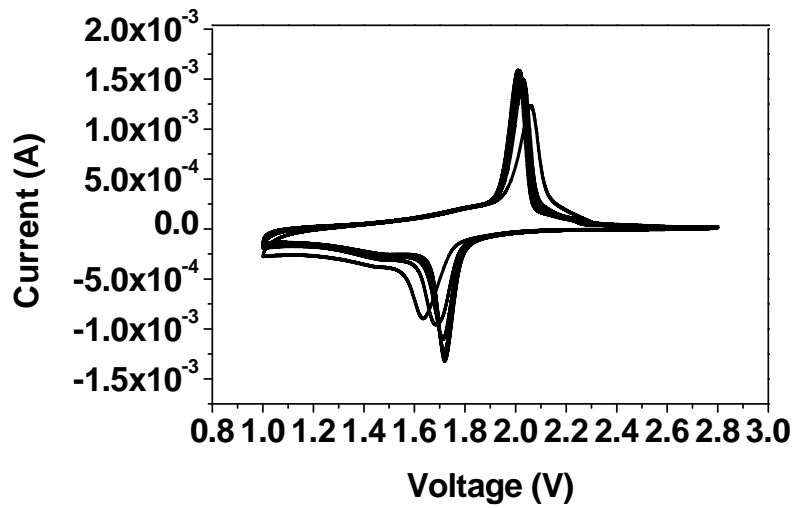
#### 1. Charge - Discharge cycling



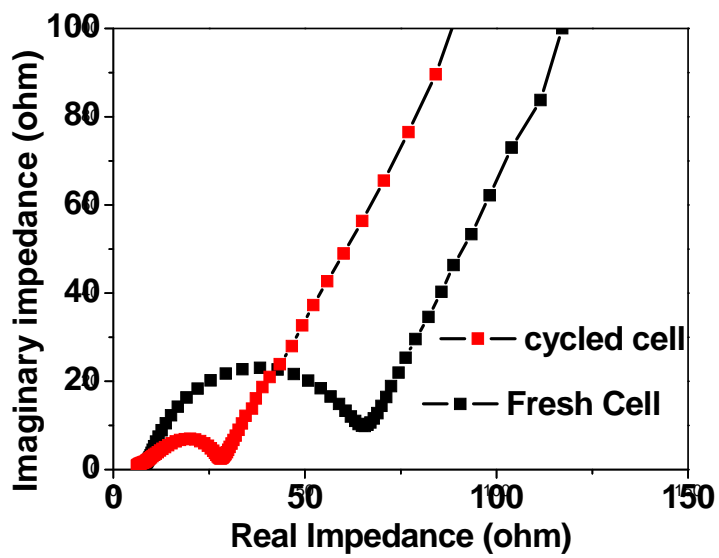
#### 2. Cycle Number Vs Capacity



## 2. Cyclic Voltammogram



## 3. Electrochemical impedance spectra

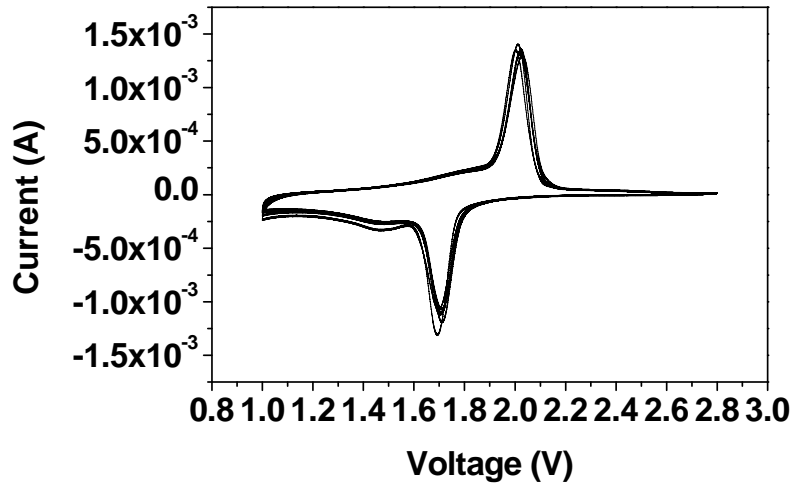


- **Titanium dioxide with Li**

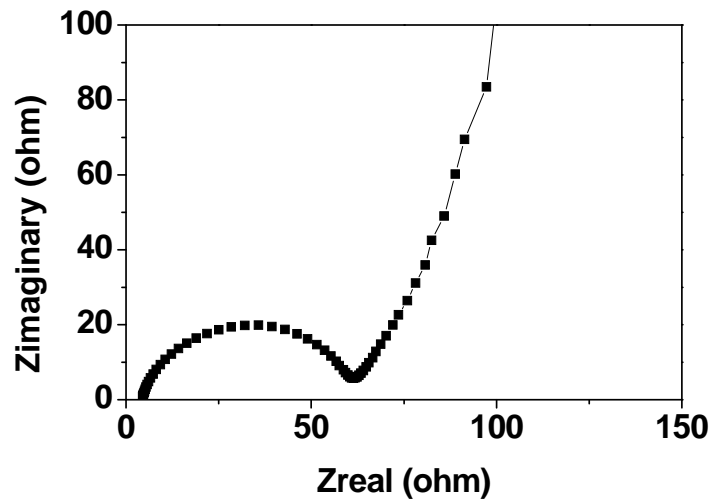
### 1. Charge - Discharge Cycling

The cell is still running

2. CV



3. Electrochemical impedance spectrum



As the cell is still running the EIS of the cell has not been carried out.