

Facile preparation of mesoporous graphite felt electrode via oxidative etching for high performance vanadium redox flow battery

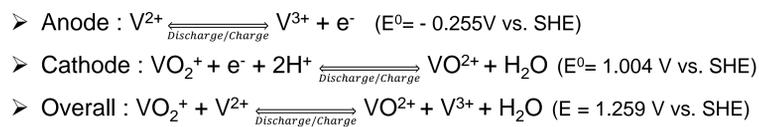


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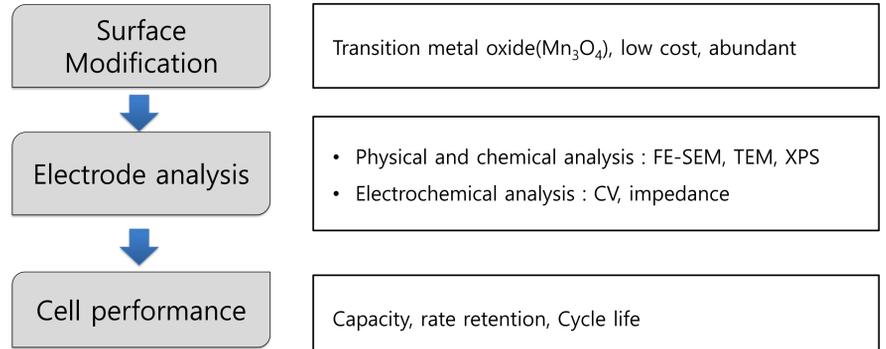
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Introduction

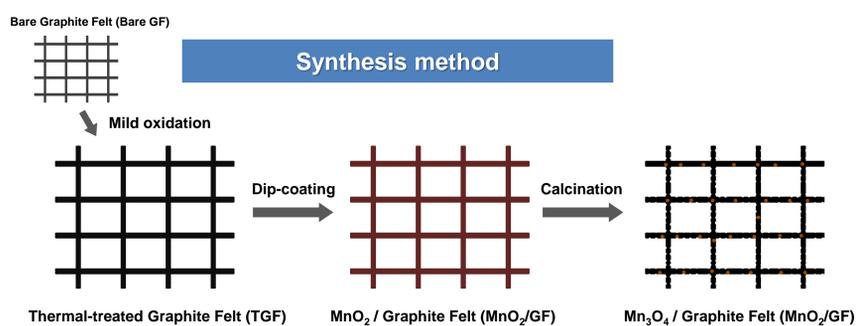


- Redox flow batteries (RFBs) : Excellent scalability, high energy efficiency, long cycle life
- Vanadium redox flow battery (VRFB)
 - Advantage : High energy density among RFBs, non-cross contamination through membrane
 - Disadvantage : self-discharge, crossover through membrane

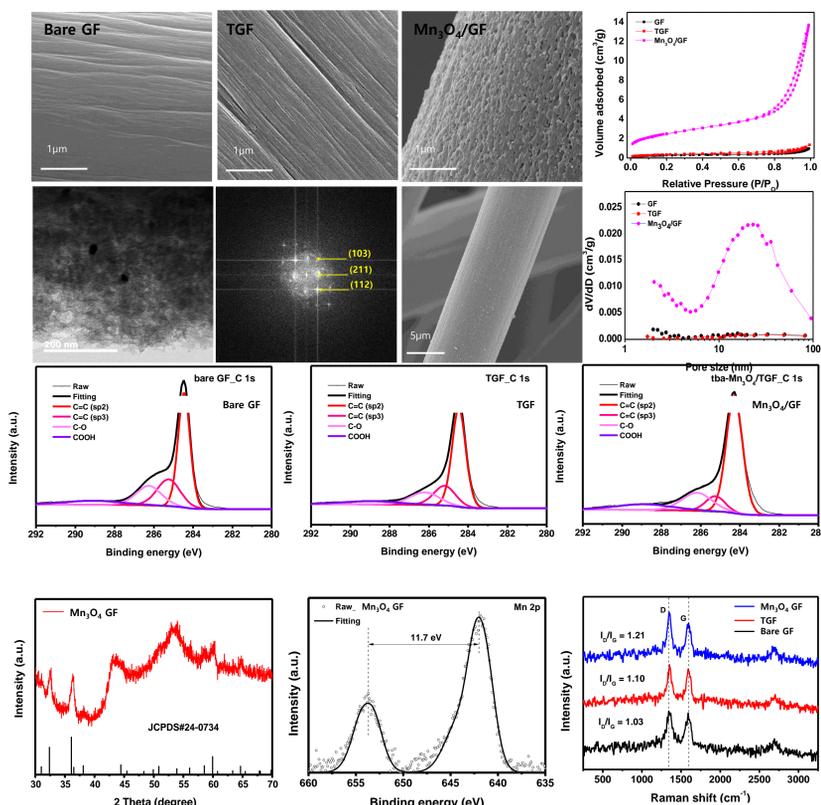
Approach



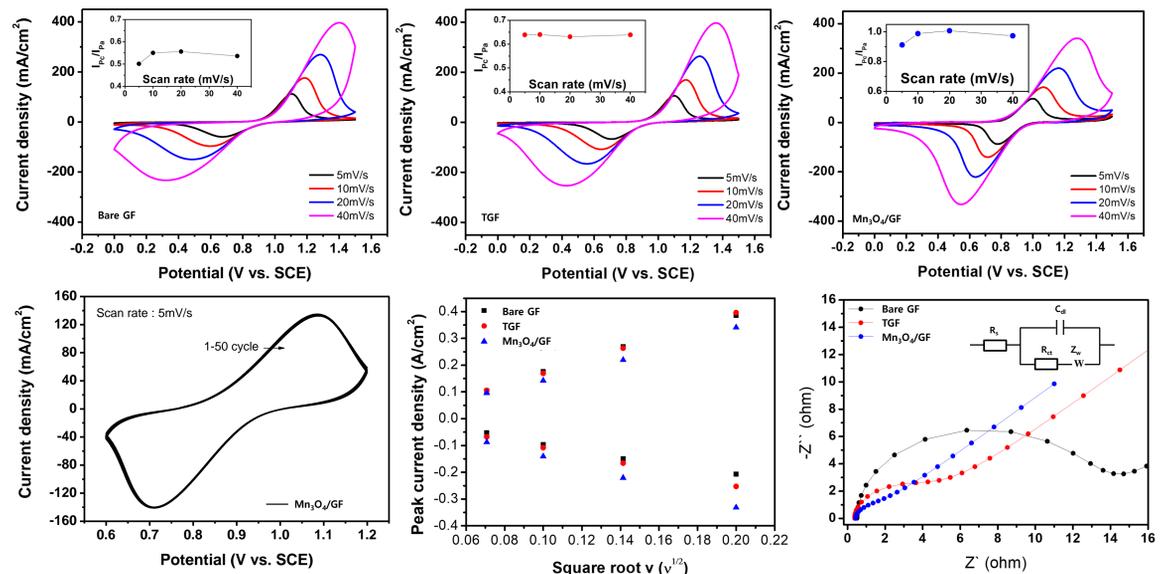
Results and discussion



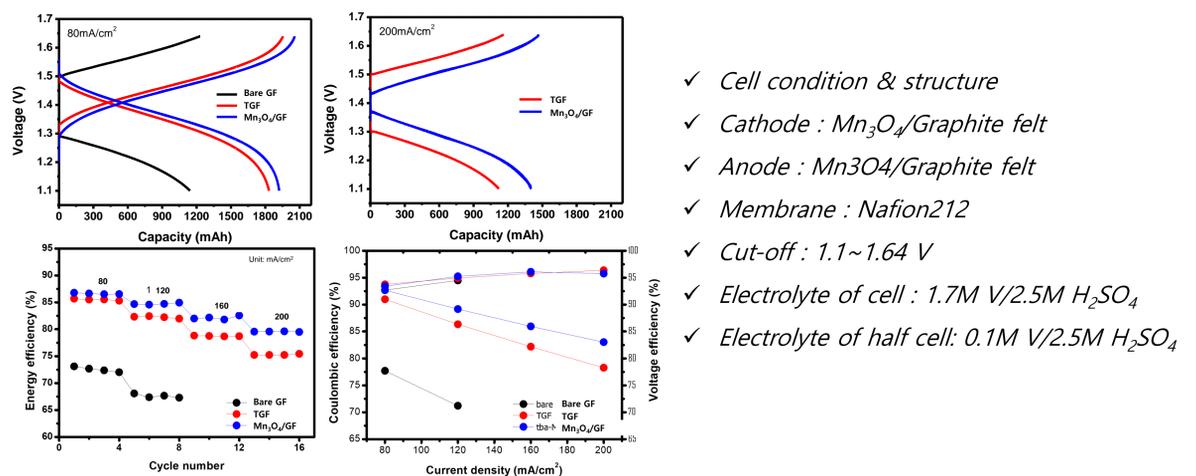
Surface properties



Electrode properties



VRFB properties



- ✓ Cell condition & structure
- ✓ Cathode : Mn₃O₄/Graphite felt
- ✓ Anode : Mn₃O₄/Graphite felt
- ✓ Membrane : Nafion212
- ✓ Cut-off : 1.1~1.64 V
- ✓ Electrolyte of cell : 1.7M V/2.5M H₂SO₄
- ✓ Electrolyte of half cell : 0.1M V/2.5M H₂SO₄

Conclusion

- Polarization of Mn₃O₄-modified VRFB cell is reduced more than that of non-modified VRFB cell
- Especially, the kinetic role played with oxygen species and transition metal is ascribed well.
- Energy efficiency of Mn₃O₄-modified VRFB cell increase with the high current density compared non-modified VRFB cell.
- As a result, the VE and, EE values is high at 80-200mA/cm² compared with that of non-modified graphite VRFBs.

Acknowledgement

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