

# VO<sub>2</sub>F: a new transition metal oxyfluoride with high specific capacity for Li ion batteries

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5 Received (in XXX, XXX) Xth XXXXXXXXXX 20XX, Accepted Xth XXXXXXXXXX 20XX  
DOI: 10.1039/b000000x

## SUPPORTING INFORMATION

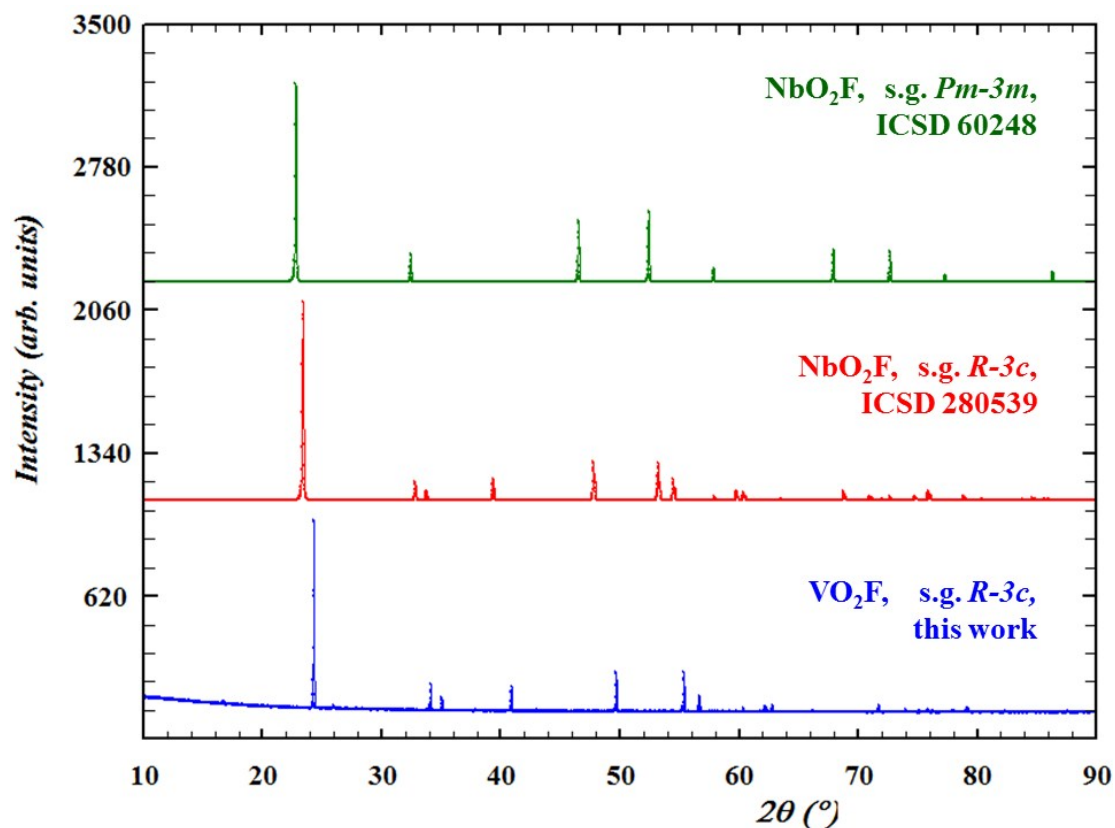
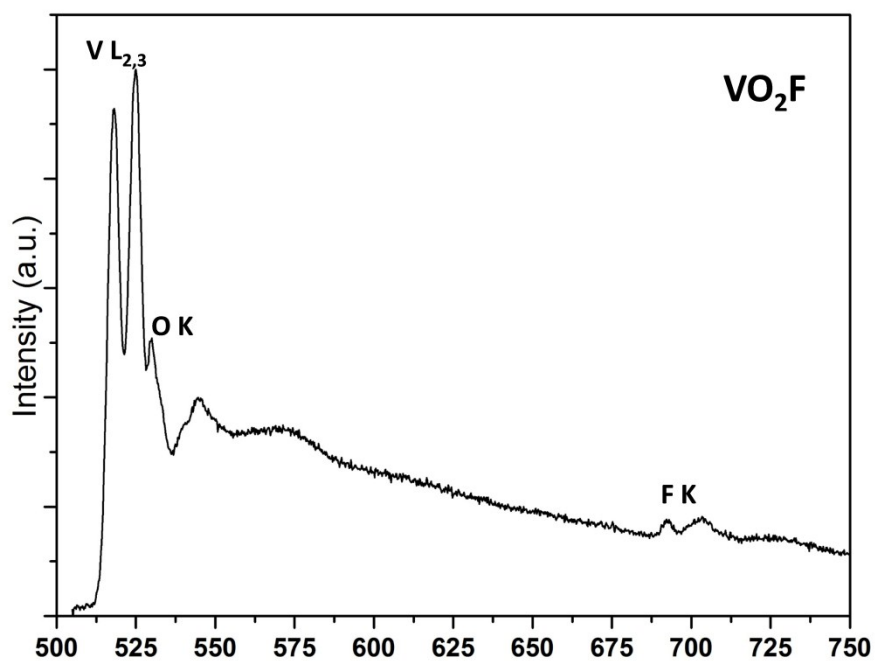
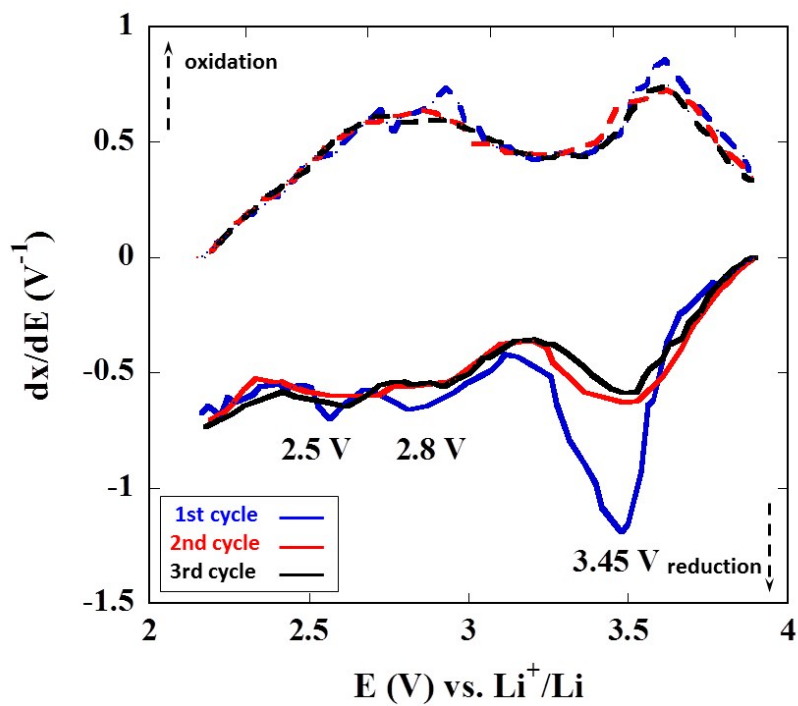


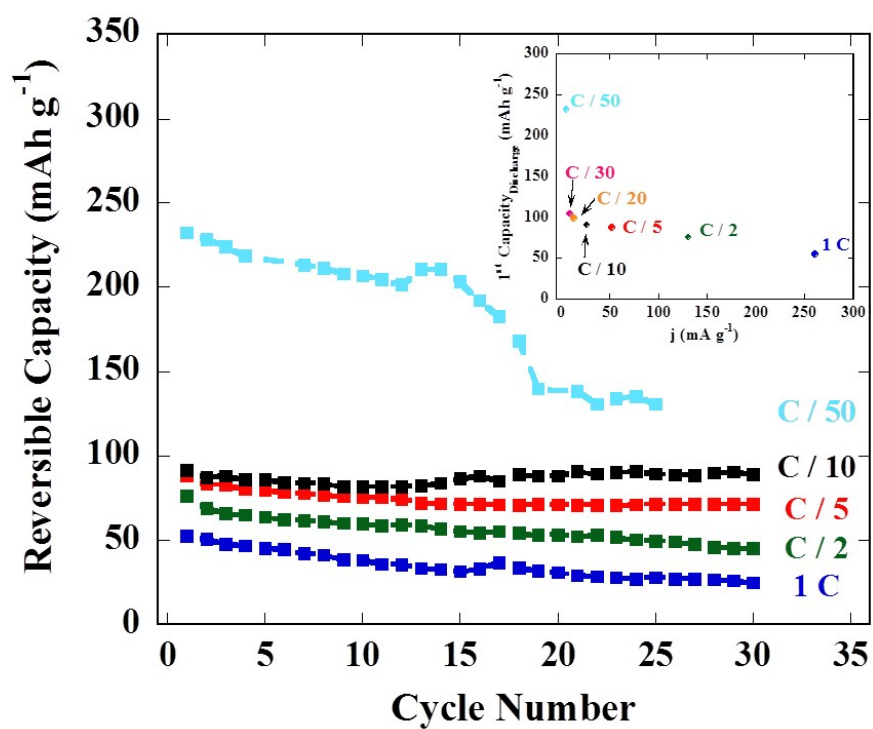
Fig. SI 1 Experimental XRD patterns of VO<sub>2</sub>F and the two polymorphs of NbO<sub>2</sub>F, *Pm-3m* and *R-3c*, (ICSD reference number 60248 and 280539, respectively) showing the similarity with the latter.



5 **Fig. SI 2** EELS spectrum of  $\text{VO}_2\text{F}$  showing the  $\text{V-L}_{2,3}$ ,  $\text{O-K}$  and  $\text{F-K}$  ionization edges.



10 **Fig. SI 3.** Differential capacity  $\text{dx/dE}$  vs. voltage plot for  $\text{VO}_2\text{F}$  at room temperature. The first three cycles of a lithium half cell are shown.



**Fig. SI 4.** Cycling behaviour of lithium half cells bearing VO<sub>2</sub>F as the electrode active material in the 3.9-2.2 V range at different C/n rates. The inset shows the first discharge capacity at different current densities,  $j$ .