

Vanadium Oxide Cathodes for Al-ion Battery

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Vanadium oxides (VOs) are promising prospective cathode materials for secondary Al-ion batteries. VOs such as V_2O_5 and VO_2 have been studied well as cathodes that could deliver experimental reversible capacities around 280 and 150 mAh/g, respectively. There are several other reports available about these VOs and their composites with carbon, graphene etc. But none discussed the type of Al-ion storage mechanism and corresponding structural changes incur to VOs. Herein we report in-situ and ex-situ structural and chemical studies of V_2O_5 films, VO_2 powders and other potential new VOs in order to understand Al-ion storage mechanism. Crystalline V_2O_5 films deposited by PLD method delivered a reversible capacity around 500 mAh/g in voltage window of 2500 – 5 mV and at 100 mA/g current rate. Initial cycling features indicated conversion reaction between Al and VO along with Fe and Cr that released from stainless steel casings.

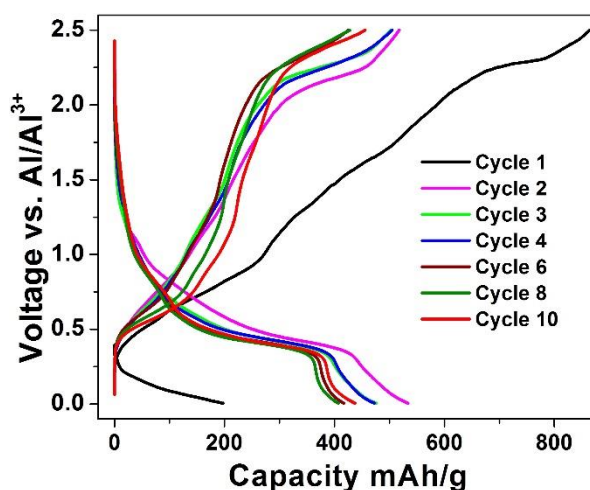


Figure: Charge-discharge characteristics of crystalline V_2O_5 film.

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