Electrochemical properties of CoV$_2$O$_4$: A novel anode material for sodium-ion batteries

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Transition metal oxides have been greatly studied on LIBs due to their high theoretical capacities (>600 mAh·g$^{-1}$) which is provided through conversion reaction with Li$^+$[1, 2]. In LIB systems, numerous vanadium containing compounds have been studied such as, ZnV$_2$O$_4$[3], CoV$_2$O$_6$[4], CuV$_2$O$_6$[5], FeVO$_4$[6], and so forth. There are vanadium containing compounds that have already been applied to SIBs and showed promising results. This study reports the spinel based transition metal oxide – CoV$_2$O$_4$ (CVO) was synthesized by solvothermal method and annealed at 500 ℃. Its electrochemical performance as anode material for sodium ion battery was investigated for the first time. Ex-situ analyses were performed in order to understand the reaction mechanism that transpire during the charge-discharge cycle. The results showed that the initial reversible capacity of CVO was 115 mAh·g$^{-1}$ at the current density of 100 mA·g$^{-1}$ in the potential window of 0.01-3.0 V. The results indicate that CVO is a potential anode material for sodium ion battery.

References: