

High Performing Na_xCoO_2 as a Cathode material for Rechargeable Sodium Batteries

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Electronic supplementary information

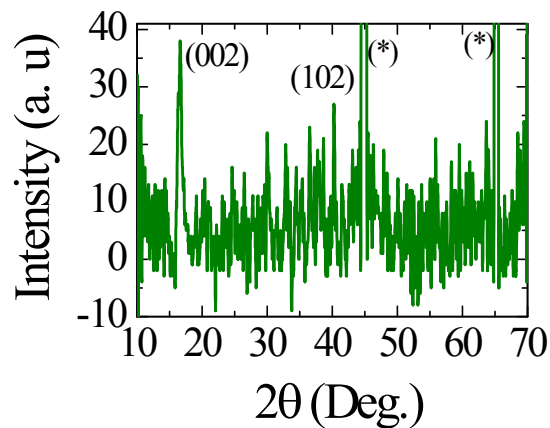


Fig. S1. XRD Pattern of Na_xCoO_2 electrode after cycling, Al peaks due to the current collector of the electrode are indexed with (*).

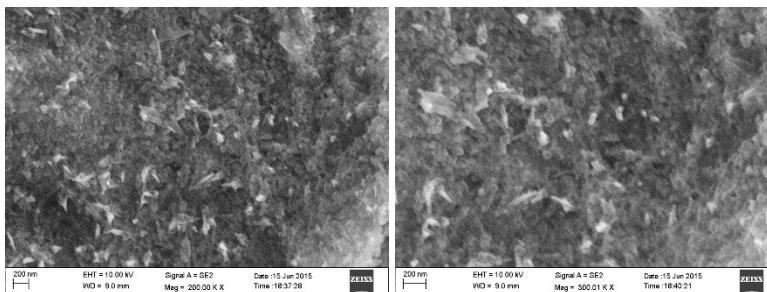


Fig. S2.
FESEM images
of Na_xCoO_2
electrode after
cycling.

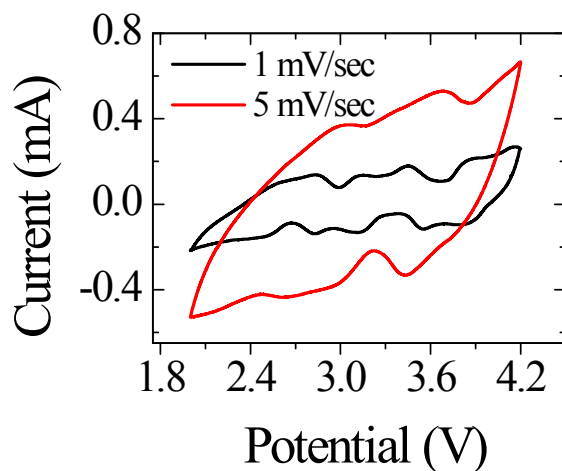
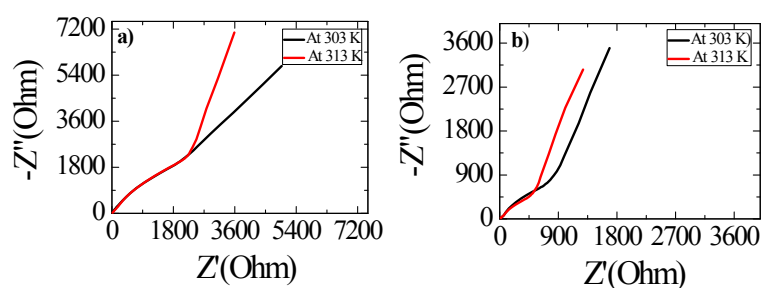


Fig. S3. CV of Na_xCoO_2 at different scan rates (1 mV and 5 mVs^{-1}).



**Fig. S4.
Nyquist plot of
the cell
measured at
two different
temperatures,
(a) Before
cycling, (b)
After cycling.**

XPS studies

The various binding energy values have been presented based on the earlier reports (online library-

<http://techdb.podzone.net/>). Co^{3+} corresponds to the binding energy value 780 eV (779.7-708.3eV), Co^{2+} corresponds to 780.2 eV (780.1-780.3 eV) and Co^0 corresponds to 778.2 eV (778.1-778.3.3 eV).

Further, it is very difficult to distinguish the oxidation state of Co by XPS. However, recently reports (ref: 26) the Co^{3+} to Co^{4+} conversion during charge/discharge process has been explained by XPS study. Whereas, the prepared material exhibits the $\text{Co}2p_{3/2}$ binding energy value at 779.8 eV, which is very close to standard database value of Co^{3+} . Thus, we confirm that, in Na_xCoO_2 , Co is exist in +3 oxidation state.