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Sodium insertion in carboxylate based materials and their application in 3.6 V full sodium cells

Ali Abouimrane*, Wei Weng, Hussameldin Eltayeb, Yanjie Cui, Jens Niklas, Oleg Poluektov, and Khalil Amine*

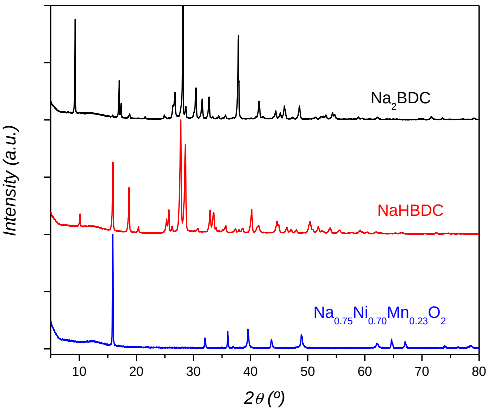

Figure S1. XRD of Na_2BDC, NaHBDC and $Na_{0.75}Mn_{0.7}Ni_{0.23}O_2$ pristine materials.

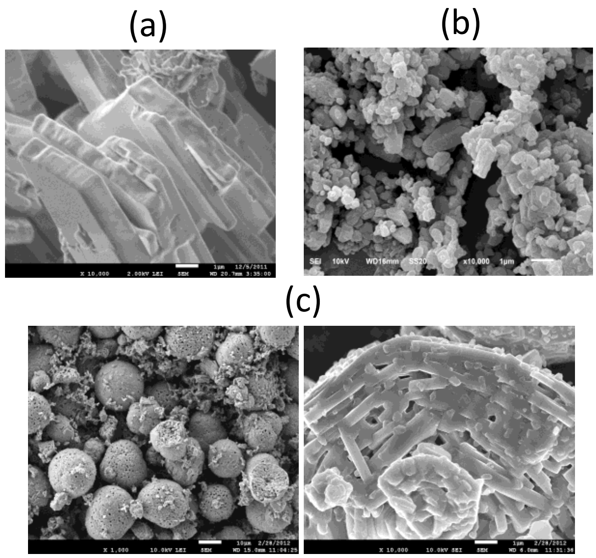

Figure S2. SEM pictures of Na_2BDC (a), NaHBDC (b) and $Na_{0.75}Mn_{0.7}Ni_{0.23}O_2$ (c). For $Na_{0.75}Mn_{0.7}Ni_{0.23}O_2$ material, SEM images shows the formation of ~ 20 μm particle size spherical secondary particles.

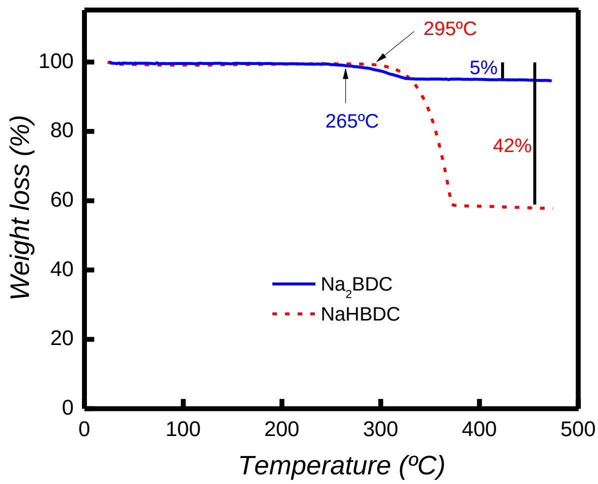

Figure S3. TGA of of Na_2BDC, and NaHBDC showing good thermal stability until ~ 480ºC for Na_2BDC and until ~ 300ºC for NaHBDC.

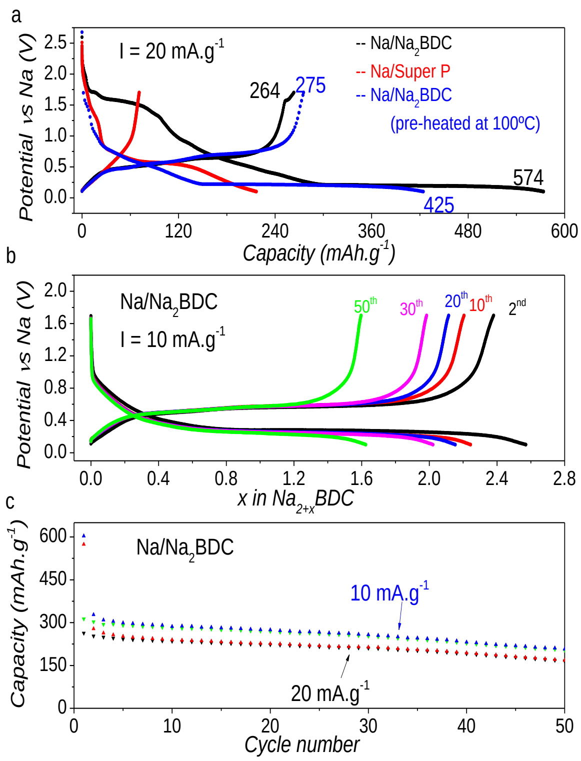

Figure S4. Voltage profile and capacity retention of Na/Na_2BDC cell for 50 cycles under 10 and 20 mA/g current density.

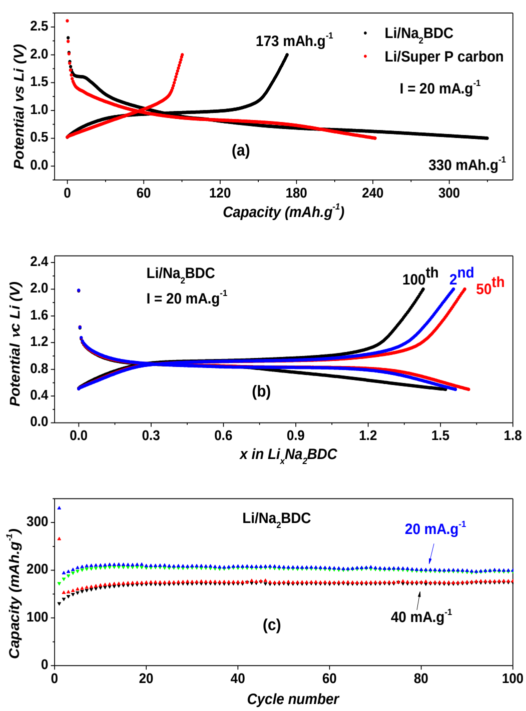

Figure S5. Voltage profile and capacity retention of Li/Na_2BDC cell for 100 cycles under 20 and 40 mA/g current density showing good cycleability.

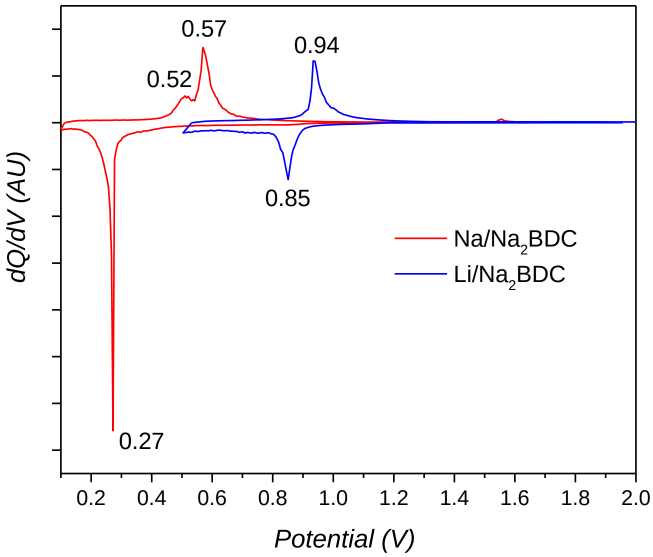

Figure S6. 2^{nd} cycle dQ/dV curves of Na/Na_2BDC and Li/Na_2BDC systems under 20 mA/g current density.

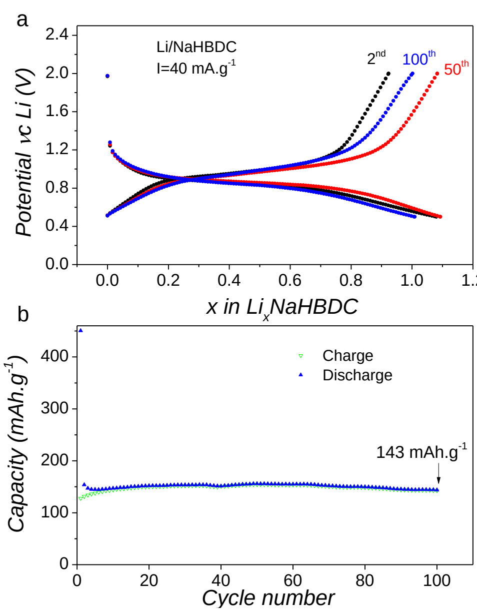

Figure S7. Voltage profile and capacity retention of of Li/NaHBDC cell for 100 cycles under 40 mA/g current density.

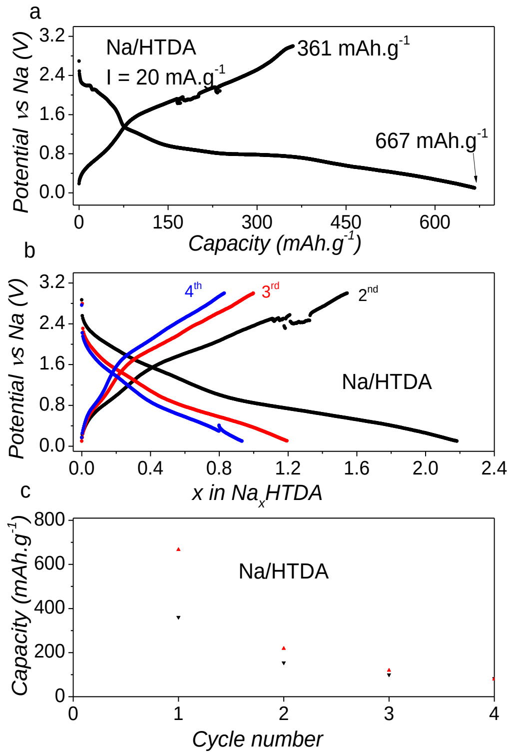

Figure S8. Voltage profile and Capacity retention of Na/HTDA half-cell showing poor cyleability.

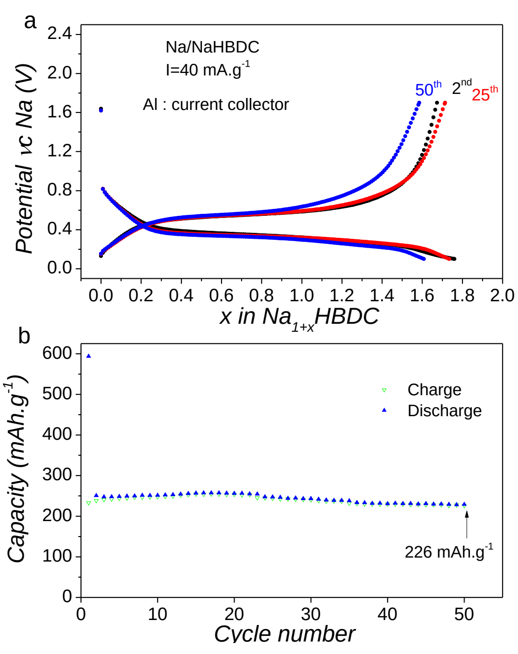

Figure S9. (a) Voltage profile and (b) Capacity retention of Na/NaHBDC half-cell for 50 cycles under the current rate of 40 mA.g^{-1} between 0.1V and 1.7V demonstrates that this anode can be cycled using Al current collector contrary to lithium batteries as no Al-Na was predicted by their phase diagram.