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# Supporting Information

**Cobalt oxide nanoparticles embedded N-CNTs: Lithium ion battery applications**

I. A. Khan,[a] F. Nasim,[a] M. Choucair,[*b] S. Ullah,[a] A. Badshah,[a] and M. A. Nadeem[*a]

[1]Catalysis and Nanomaterials Lab 27, Department of Chemistry, Quaid–i–Azam University, Islamabad 45320, Pakistan

[2]School of Chemistry, University of Sydney, Sydney, Australia 2006

*E-mail: manadeem@qau.edu.pk, Telephone: +925190642062

*E-mail: mohammad.choucair@sydney.edu.au

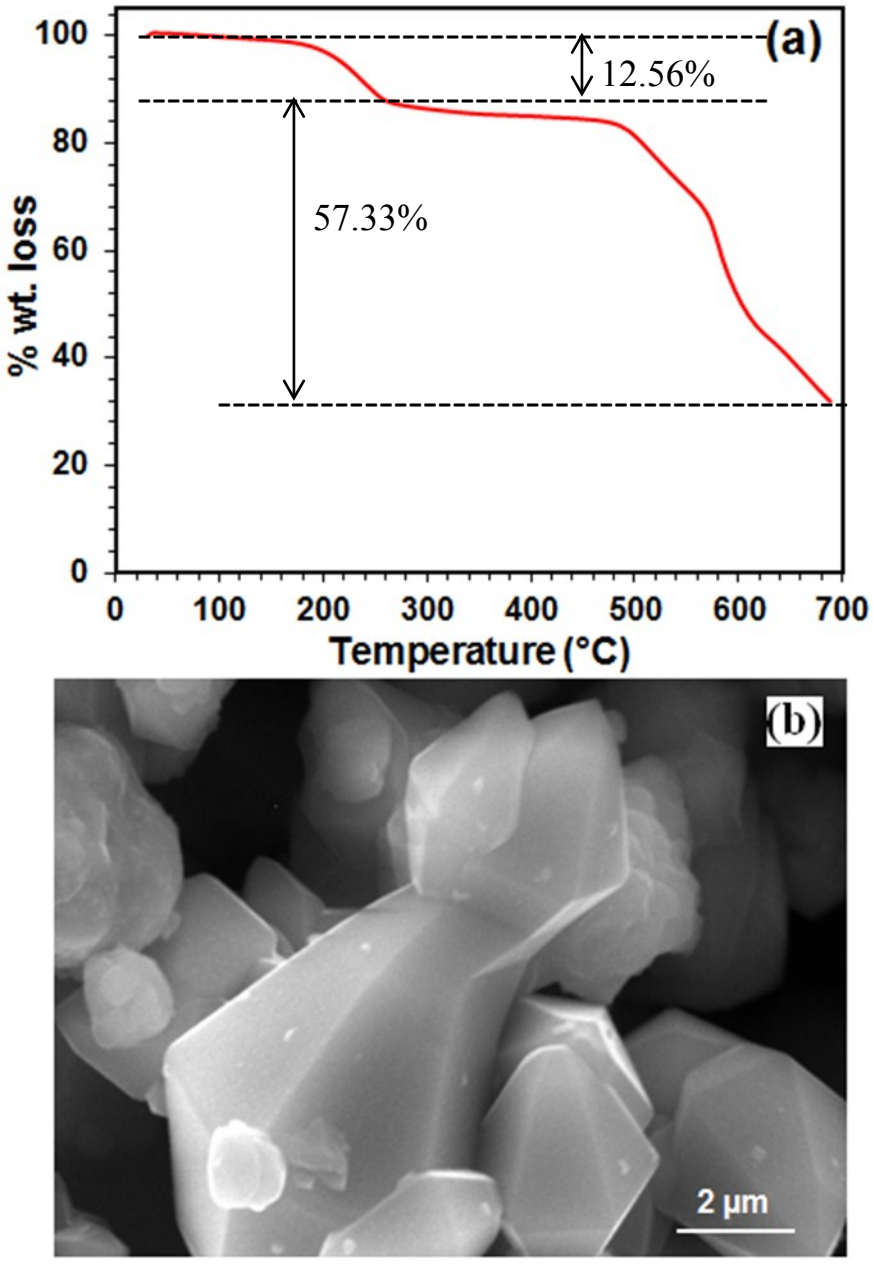


**Figure S1**. (a) Thermogravimetic plot and (b) SEM image of the synthesised ZIF–12.

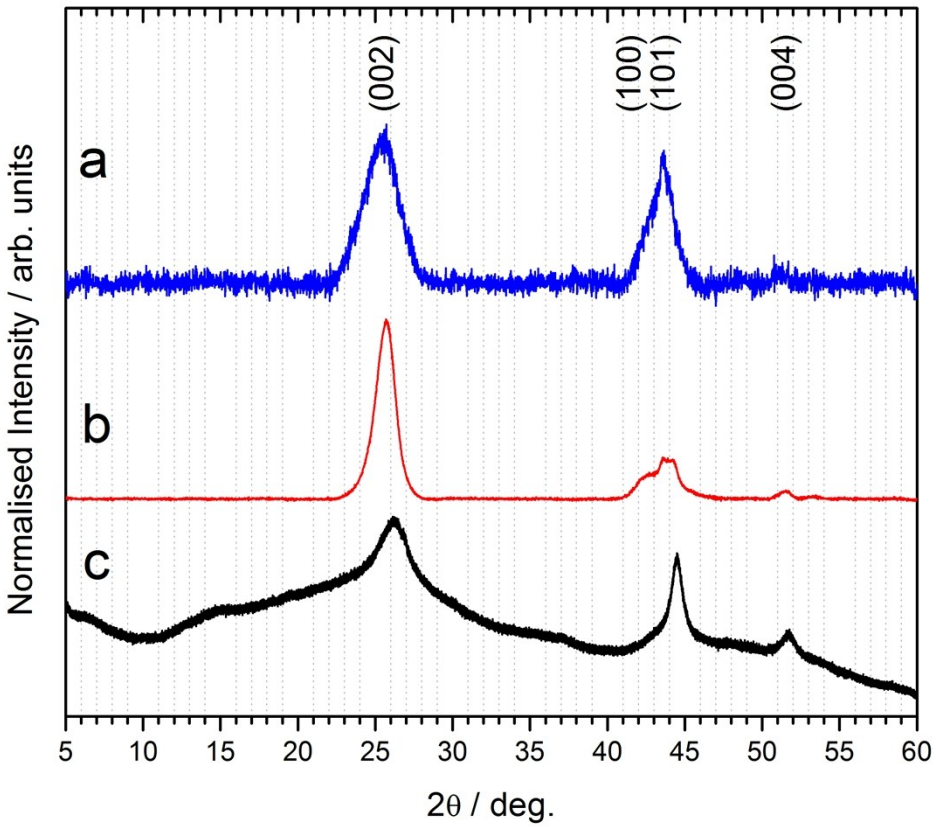


**Figure S2.** (a) SWCNT, (b) MWCNT, and (c) CoO/N-CNT (15 hour scan). Indices correspond to planes in graphitic carbon. SWCNT and MWCNT have had a background subtracted, CoO/N-CNT has no data subtraction performed.

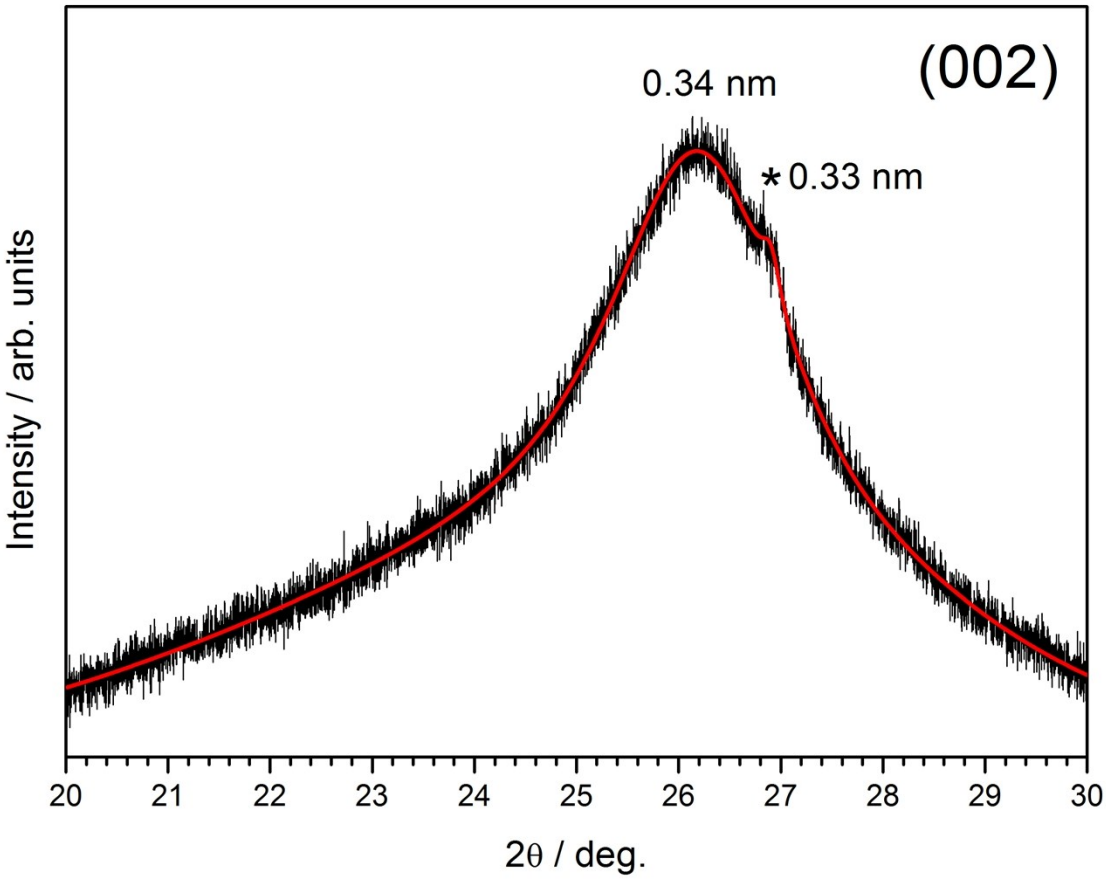


**Figure S3.** PXRD of the CoO/N-CNT material between 2θ = 20-30°. The peak corresponding to the (002) plane reflection between graphitic layers in the carbon material shows two discrete *d*-spacings of 0.34 nm and 0.33 nm. Red line is a best-fit of Voigt line-shape to the data.

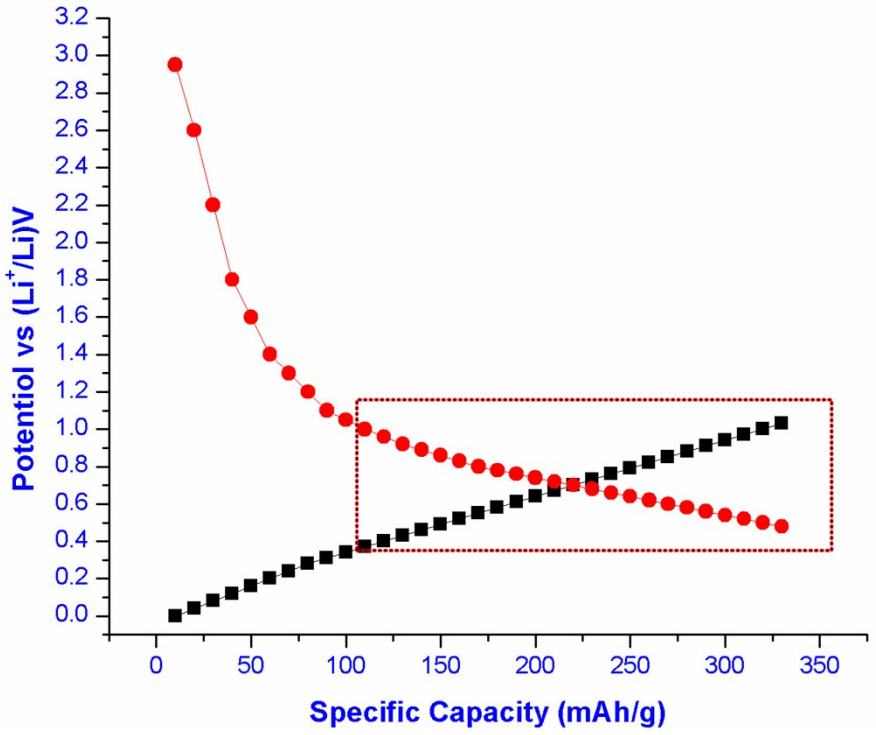


**Figure S4**. Magnified voltage profile of the CoO/N-CNTs showing small plateau (red) at ~1V.

**Table S1**– Atomic and weight percent composition of the CNT nanocomposite from XPS analysis.

| **Name** | **Assignment** | **Binding Energy (eV)** | **Atomic %** | **Weight %** |
|---|---|---|---|---|
| C 1*s* | C=C/C–C | 284.5 | 93.8 | 90.0 |
| *O 1*s* | O in Cobalt Oxides | 531.3 | 1.3 | 1.6 |
| O 1*s* | O=C | 533.3 | 0.9 | 1.2 |
| Cl $2p_{3/2}$ | Inorganic Chloride | 197.5 | 0.3 | 0.8 |
| Cl $2p_{3/2}$ | Organic Chloride | 200.2 | 0.3 | 0.7 |
| N 1*s* | Pyridinic Nitrogen | 398.6 | 1.2 | 1.4 |
| N 1*s* | Graphitic Nitrogen | 400.9 | 1.8 | 2.0 |
| Co $2p_{3/2}$ | Co Metal | 778.5 | 0.1 | 0.4 |
| Co $2p_{3/2}$ | Cobalt Oxides | 780.5 | 0.3 | 1.5 |
| Co $2p_{3/2}$ | Cobalt Oxides Satellite Peak | 784.4 | 0.1 | 0.4 |

**Table S2**– Data of the columbic efficiency with different cycle numbers.

| Cycle numbers | 1 | 2 | 5 | 10 | 50 |
|---|---|---|---|---|---|
| Columbic efficiency (%) | 83 | 85 | 90 | 95 | 97 |