Supplementary material (ESI) for Journal of Materials Chemistry
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# A Novel Architectured Electrode for Li-ion Microbatteries Based on Titania Nanotubes and Iron Oxide Nanowires

**Electronic Supplementary Information (ESI)**

This work deal with the fabrication of a nanocomposite electrode based on iron oxide on nanotubular titania matrix for its use as negative electrode for Li-ion batteries. The preparation of the electrode is by using anodization followed by electrodeposition of iron and subsequent annealing. This electrochemical method enables preparing active material directly on the current collector without any use of additives such as polymer binders and conductive agents (e.g. carbon black). The preliminary electrochemical tests of iron oxide nanowires combined with titania nanotube layer electrode reveal excellent performances (both transition metal oxides are electroactives by conversion and insertion reactions, high areal capacity and relatively good capacity retention) opening potential applications for its use in rechargeable microbatteries. In this work, areal capacities ($\mu A\ h\ cm^{-2}$) are given for charge and discharge of the cell because the applications of this nanocomposite iron-based electrode are mostly 2D-Li-ion-microbatteries, although volumetric and gravimetric capacities are also described to give further details of this novel nanoarchitectured electrodes.

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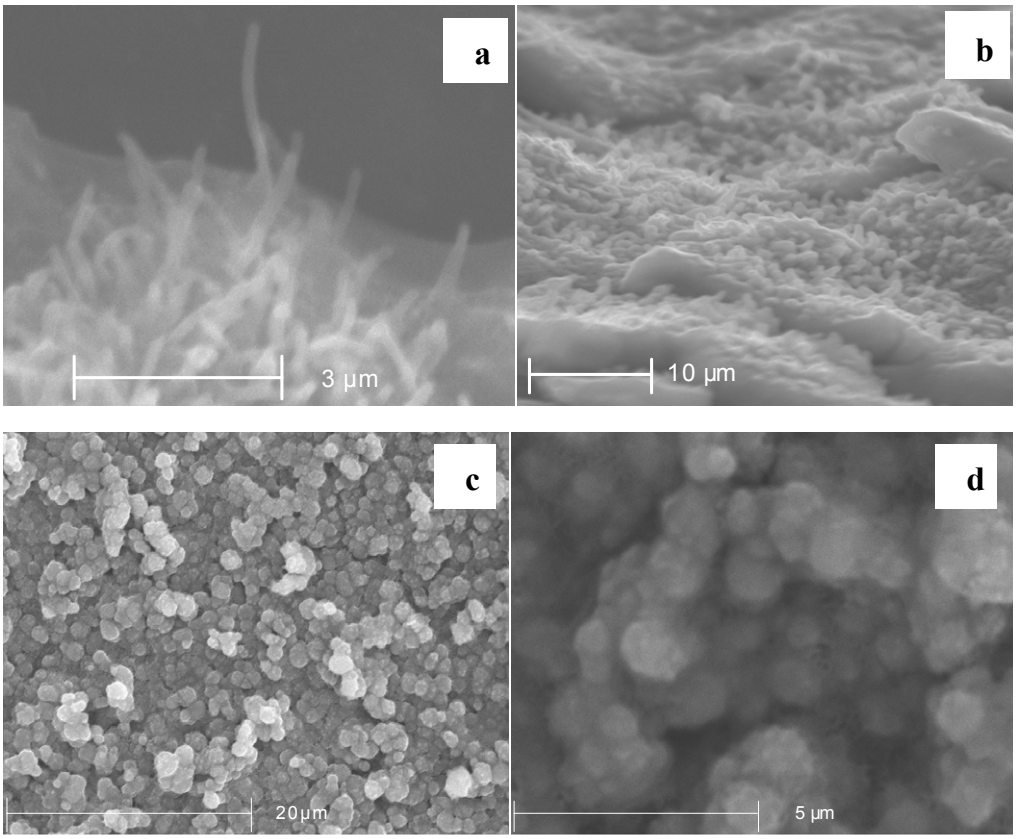


**Figure S1.** Additional ex-situ SEM micrographs of nw$Fe_2O_3$/nt$TiO_2$ after prolonged reaction with lithium: (a,b) from iron oxide nanowires and (c,d) from iron oxide microballs onto titania nanotubes.

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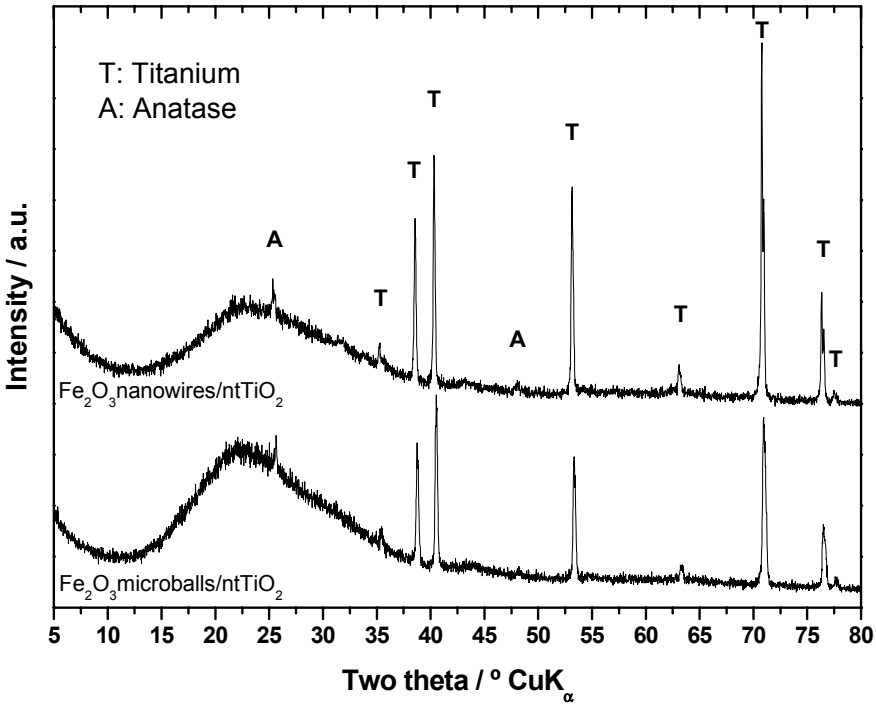


**Figure S2.** Post-mortem XRD patterns of $nwFe_2O_3/ntTiO_2$ and $mbFe_2O_3/ntTiO_2$ electrodes after reacting with lithium. The diffactrograms were recorded in charge state (3.0 V) and using scan rate of 0.15º (2θ) / min. The broad band between 15 and 30º (2θ) correspond to the plastic bag which covered the electrodes to avoid air contamination. Titania nanotubes survives after long cycling in the cell and this information is consistent with our previous work (see Refs. 14 and 15 in the manuscript).