Journal Name

SUPPORTING INFORMATION

Effect of annealing atmosphere on $LiMn_2O_4$ for thin film Li-ion Batteries from aqueous Chemical Solution Deposition.

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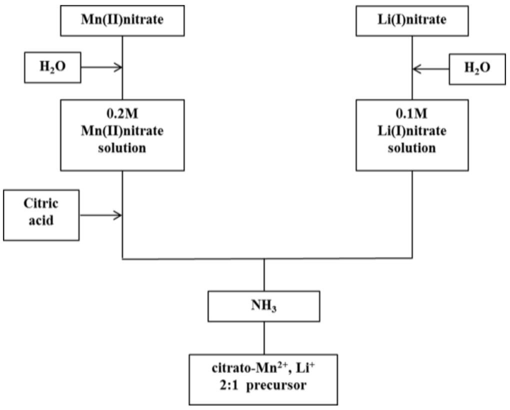

Figure S1: Synthesis scheme of the aqueous precursor solution

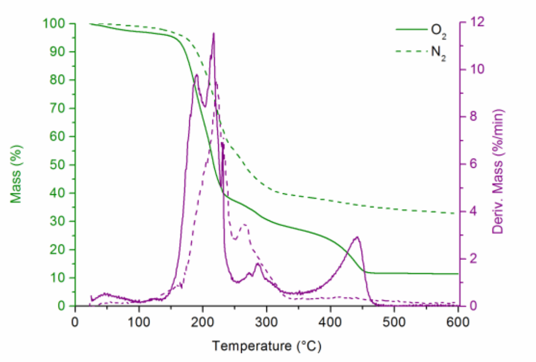

Figure S2: a) TGA (Mass %), DTG (Derivative of mass) analysis of the dried citrate-Mn^{2+},Li^{+} precursor gel. The analyses are performed in O_2 (solid line) and N_2 (dashed line).

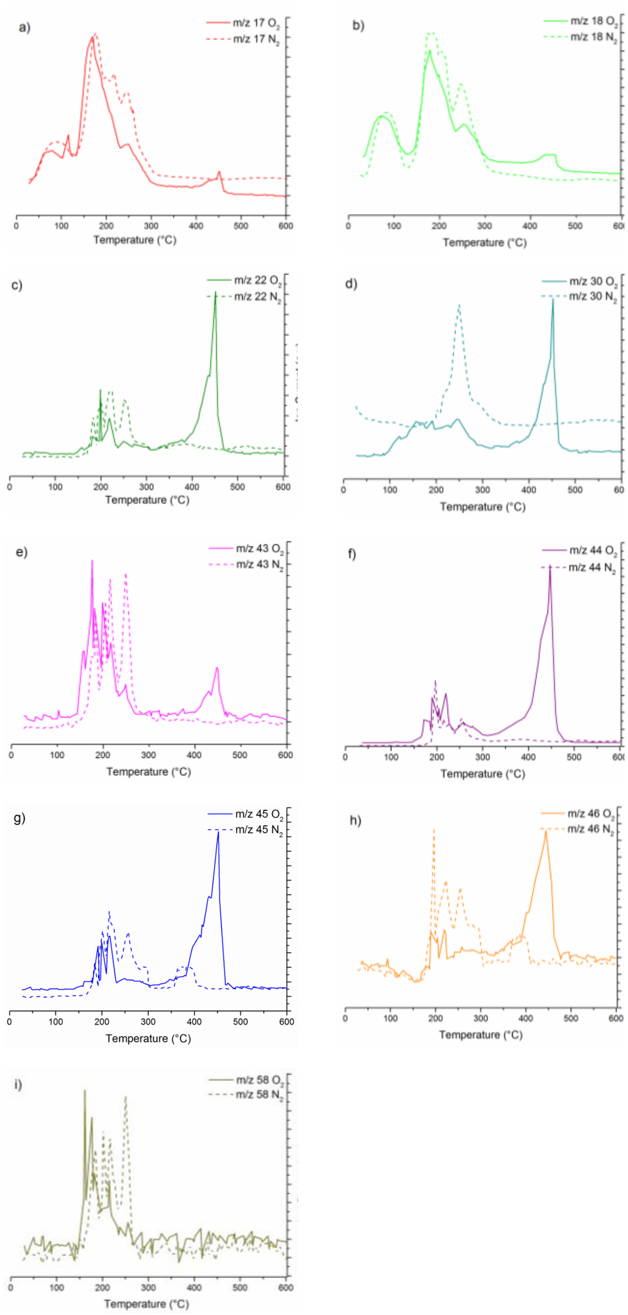

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Figure S3 (a-i): TGA-MS profiles of the dried citrate-Mn^{2+},Li^+ precursor gel at 60°C, recorded in N_2 and O_2 at a heating rate of 10°C/min. Ions with m/z 17 (OH^+, $NH_3^{+\cdot}$) and 18 ($H_2O^{+\cdot}$, NH_4^+) are fragments related to water and ammonia. Ions with m/z 22 (CO_2^{++}), 44 ($CO_2^{+\cdot}$, $H_2N\text{-}C{=}O^+$, $C_3H_8^+$) and 45 ($^{13}CO_2^{+\cdot}$) are fragments related to the carboxylate groups. Ions with m/z 30 (NO^+, $C_2H_6^+$, $H_2N{=}CH_2^+$), 43 ($HNCO^{+\cdot}$, $C_2H_7^+$), 44 ($CO_2^{+\cdot}$, $H_2N\text{-}C{=}O^+$), $C_3H_8^+$) are fragments related to the interaction between carboxylic acid groups and NH_3. Ions with m/z 46 (NO_2^+, $C_2H_5OH^{+\cdot}$) and 58 ($C_3H_6O^{+\cdot}$) together with previous ones (m/z 30, 43, 44) are fragments related to the citrate's skeleton. Only the most relevant fragments are shown and cited in the article. Note that each sub-figure has its own Ion current scale.

It can be noted that fragments 30 (NO^+, $C_2H_6^+$, $H_2N{=}CH_2^+$), 43 ($HNCO^{+\cdot}$, $C_2H_7^+$) and 44 ($CO_2^{+\cdot}$, $H_2N\text{-}C{=}O^+$) evolve at lower temperature in O_2 atmosphere (180-190˚C) motivating partially the faster mass lost in oxidative atmosphere around the same temperature.

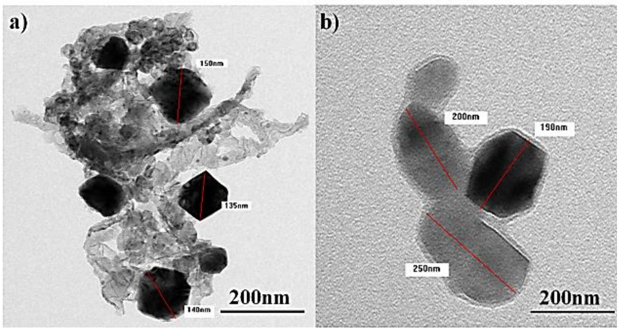

Figure S4: TEM images of powders obtained after calcining dried precursor gels at 450 °C for 1h in a) N_2 and b) O_2

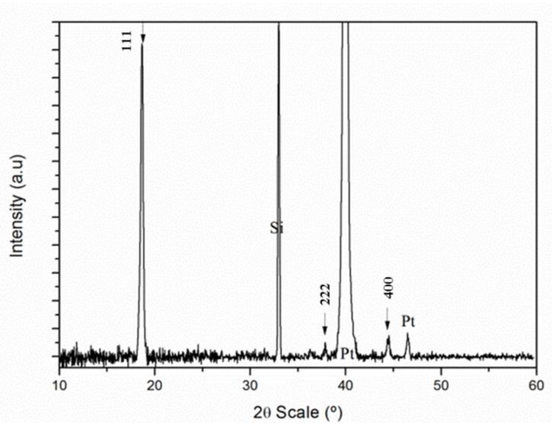

Figure S5: XRD of film on Si/SiO_2/TiN/Pt substrate, heated at 450ºC for 1h in N_2. Arrow represents $LiMn_2O_4$ face centered cubic spinel phase (JCPDS 89-0117).

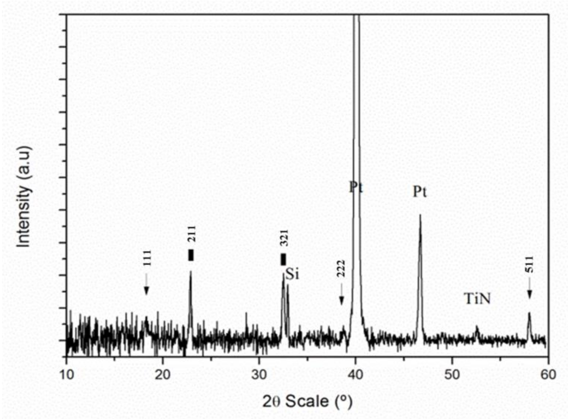

Figure S6: XRD of film on Si/SiO_2/TiN/Pt substrate, heated at 450ºC for 1h in O_2. Arrow represents $LiMn_2O_4$ face centered cubic spinel phase (JCPDS 89-0117), square represents gamma Mn_2O_3 tetragonal (JCPDS 06-0540).

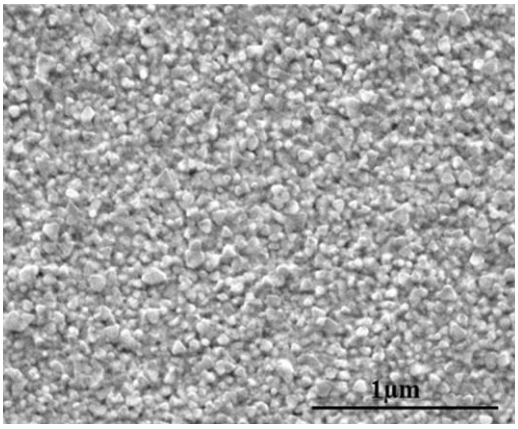

Figure S7: SEM Pictures of films on Si/SiO_2/TiN/Pt, annealed in N_2 at 450°C

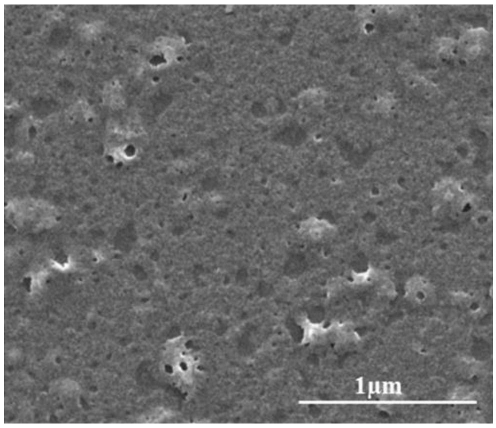

Figure S8: SEM Pictures of films on Si/SiO_2/TiN/Pt, annealed in O_2 at 450°C for 1h at 10°C/min.

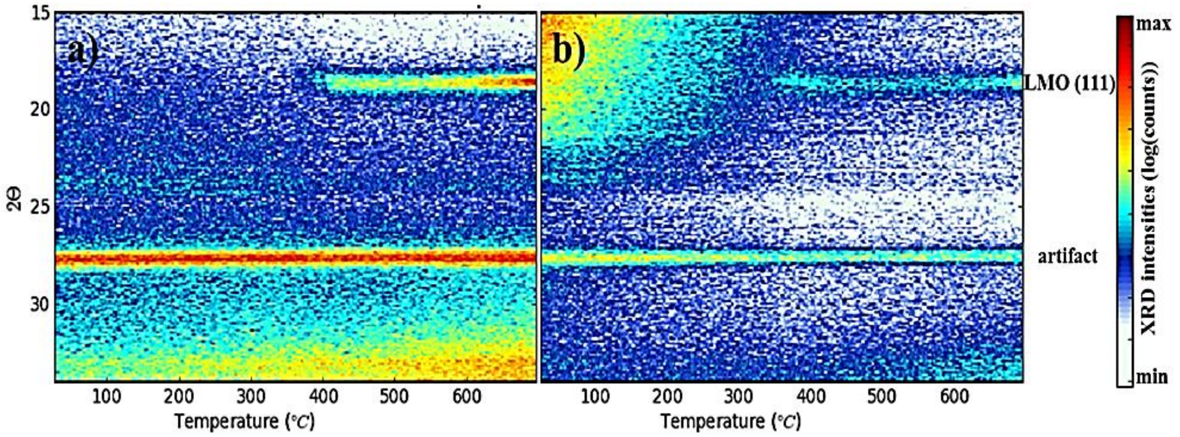

Figure S9: In-situ XRD of spincoated films on Si substrate, recorded in N_2 and O_2 at a heating rate of 12 °C.min^{-1}. The reflection at 27,5°2ϑ originates from a detector artifact.

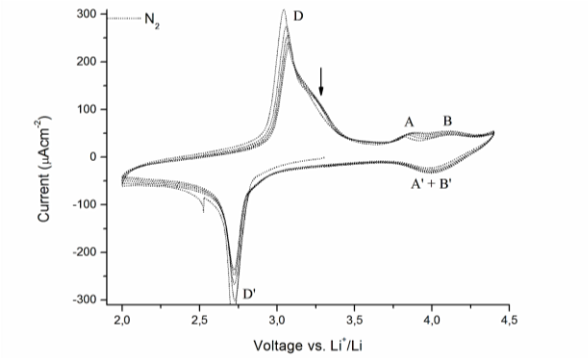

Figure S10: Cyclic Voltammogram (first 5 cycles, 10mV/sec) of the films onto Si/ Si/SiO2/TiN/Pt, after annealing at 800 °C for 3h in N_2

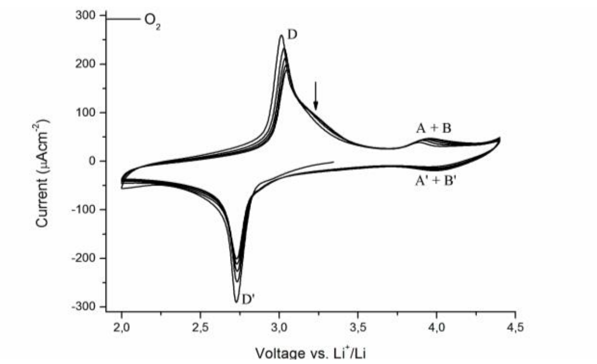

Figure S11: Cyclic Voltammogram (first 5 cycles, 10mV/sec) of the films onto Si/ Si/SiO2/TiN/Pt, after annealing at 800 °C for 3h in O_2