nanomaterials

MDPI

Supplementary materials

The temperature effect on the electrochemical performance of sulfur doped $LiMn_2O_4$ in Li-ion cells

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Table S1. Parameters of EIS measurements for LMO and $LMOS_{0.03}$ based electrodes.

		Li/LMO				Li/$LMOS_{0.03}$			
		R_1	R_{SEI}	R_{CT}	R_E	R_1	R_{SEI}	R_{CT}	R_E
5°C	before cycling	11	-	443	244	10	-	441	161
	after 70th cycles	12	14	213	106	14	7	227	124
25°C	before cycling	7	-	76	26	5	-	67	24
	after 70th cycles	5	3	48	61	5	2	61	116
60°C	before cycling	4	-	4	7	4	-	4	8
	after 70th cycles	5	4	26	26	4	15	23	13

R_1, R_{SEI}, R_{CT} and R_E stand for ohmic resistance, solid electrolyte interface (SEI) resistance, charge transfer resistance and electronic resistance, respectively

Linear relation between peak current density and square root of scan rate- for effective lithium ion diffusion coefficients (D_{Li+}) calculations

Both spinel materials in different conditions exhibit linear relation between current and square root of scan rate (R^2 linear fit correlations exceed 0.99).

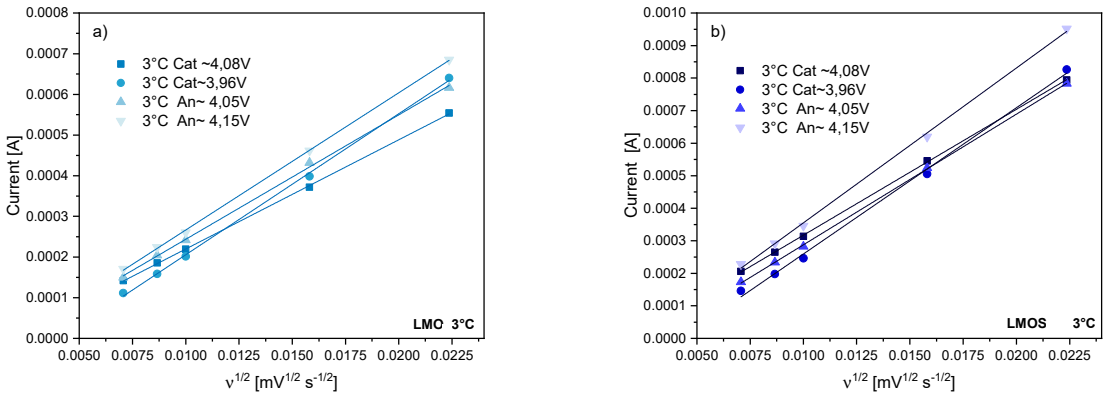

Figure S1. The linear relation between current and square root of scan rate for (**a**) $LiMn_2O_4$ as well as (**b**) $LiMn_2O_{3.97}S_{0.03}$ at 3°C.

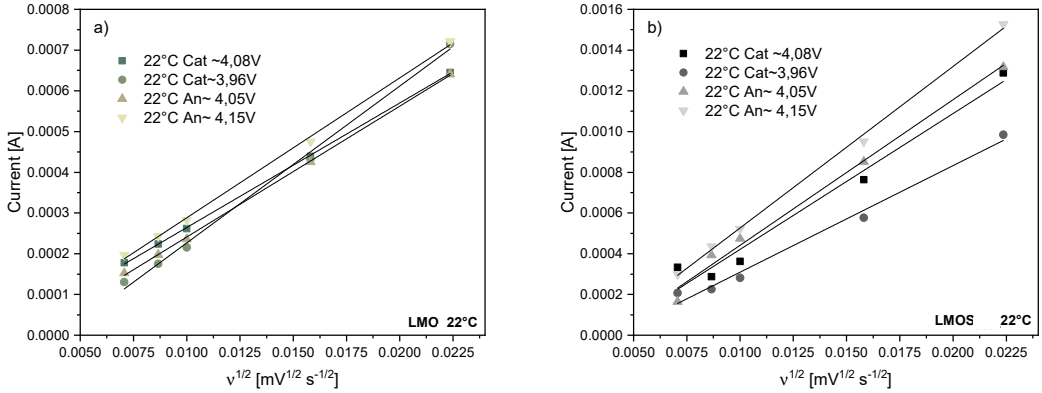

Figure S2. The linear relation between current and square root of scan rate for (**a**) $LiMn_2O_4$ as well as (**b**) $LiMn_2O_{3.97}S_{0.03}$ at 22°C.

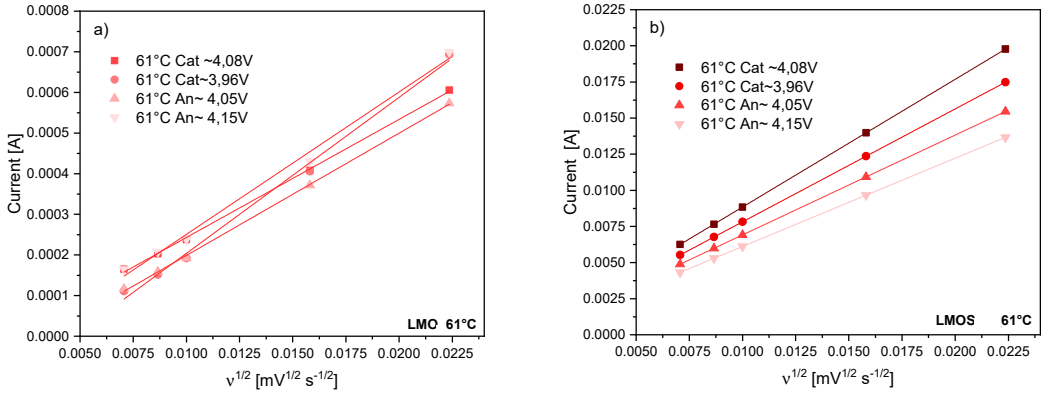

Figure S3. The linear relation between current and square root of scan rate for (**a**) $LiMn_2O_4$ as well as (**b**) $LiMn_2O_{3.97}S_{0.03}$ at 61°C.