Supplementary Information (SI) for Journal of Materials Chemistry A.

Bridging the Gap between Manganese Oxide Precursors Synthesis and Lithium Manganese Oxide Cathodes for High-Voltage Lithium-Ion Batteries

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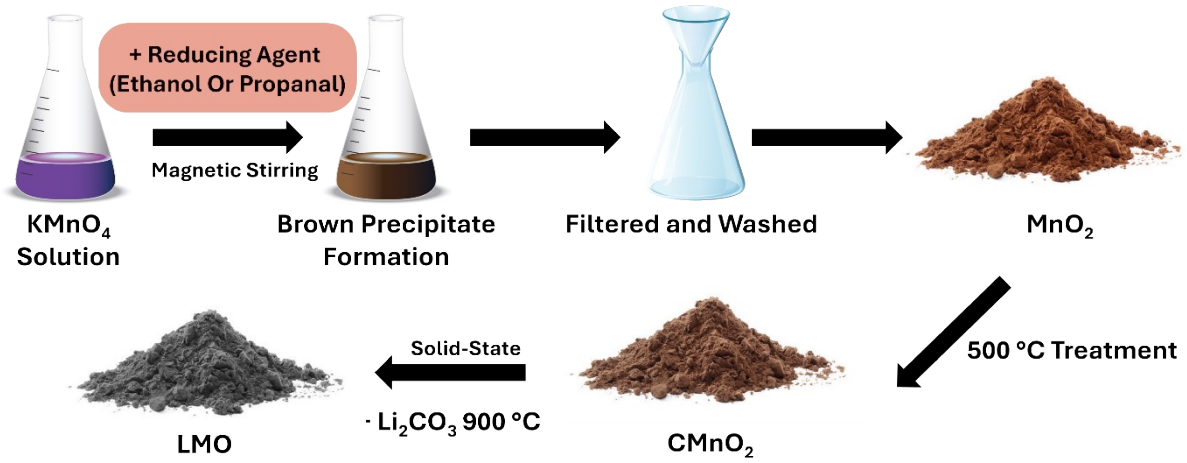

Figure S1: Schematic illustration of the synthesis of MnO_2, $CMnO_2$ and LMO using ethanol (-OH) and propanal (-CHO)

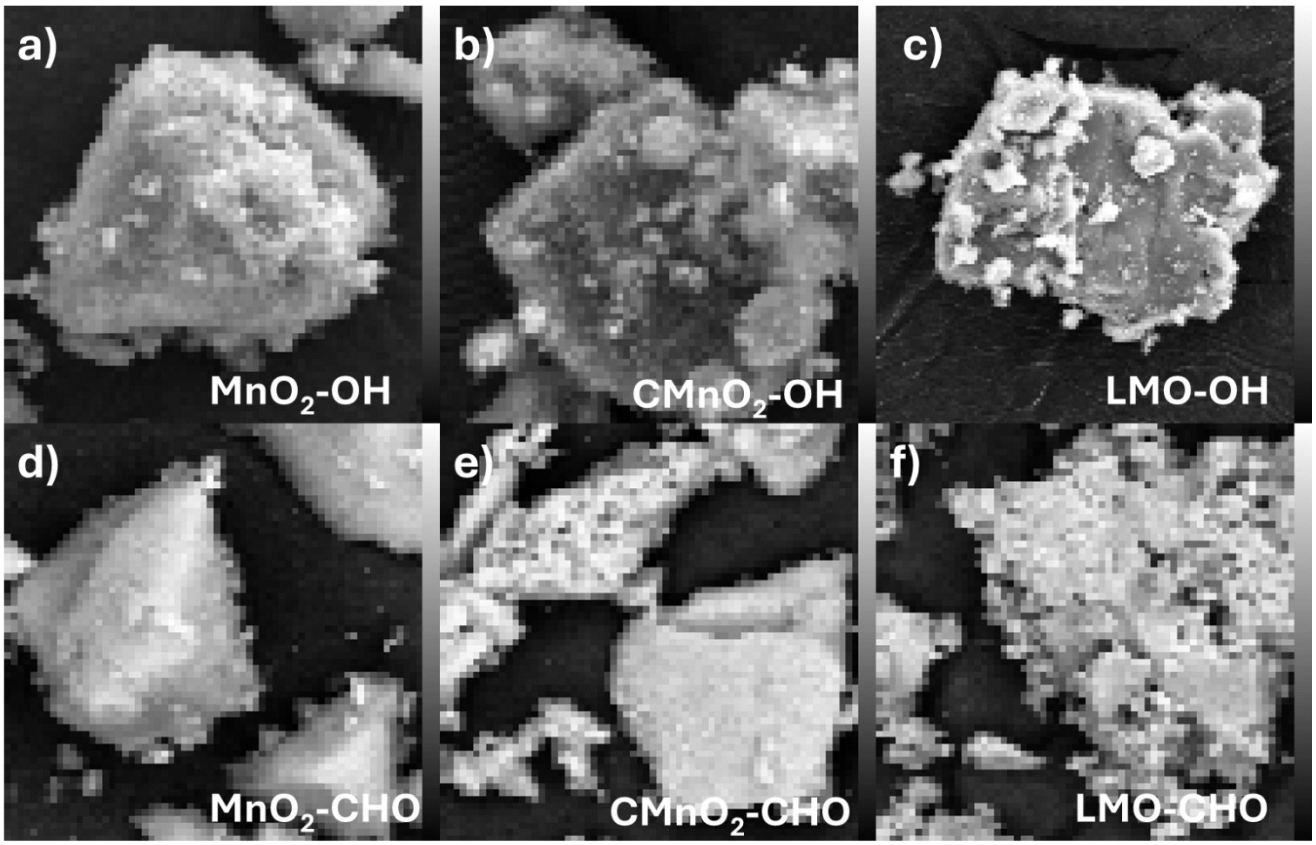

Figure S2: SEM images of a) MnO_2-OH, b) $CMnO_2$-OH, c) LMO-OH, d) MnO_2-CHO, e) $CMnO_2$-CHO f) LMO-CHO

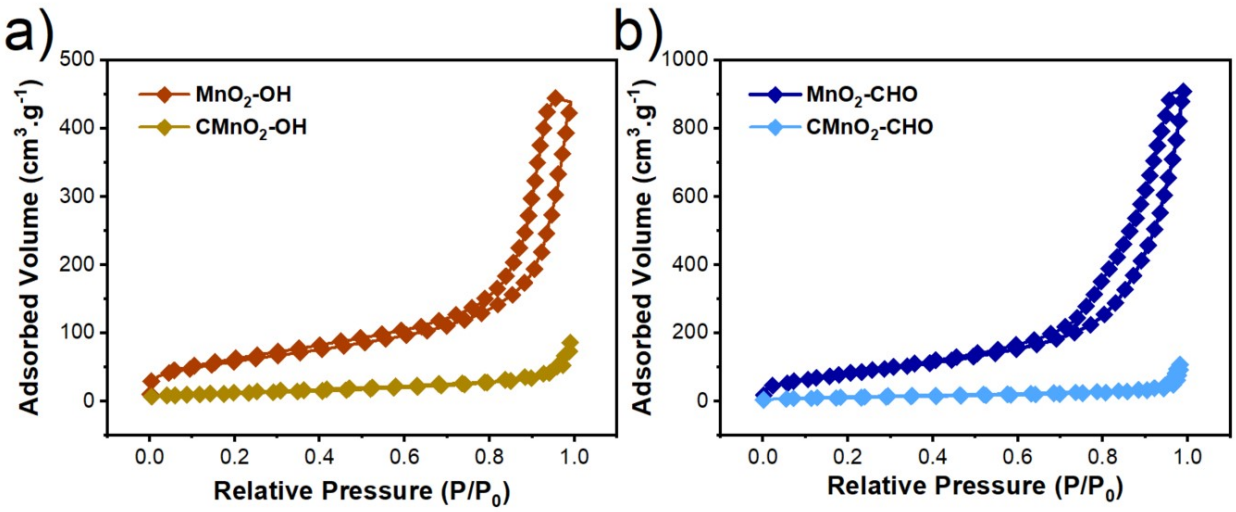

Figure S3: Adsorption isotherms of a) MnO_2-OH and $CMnO_2$-OH, b) MnO_2-CHO and $CMnO_2$-CHO

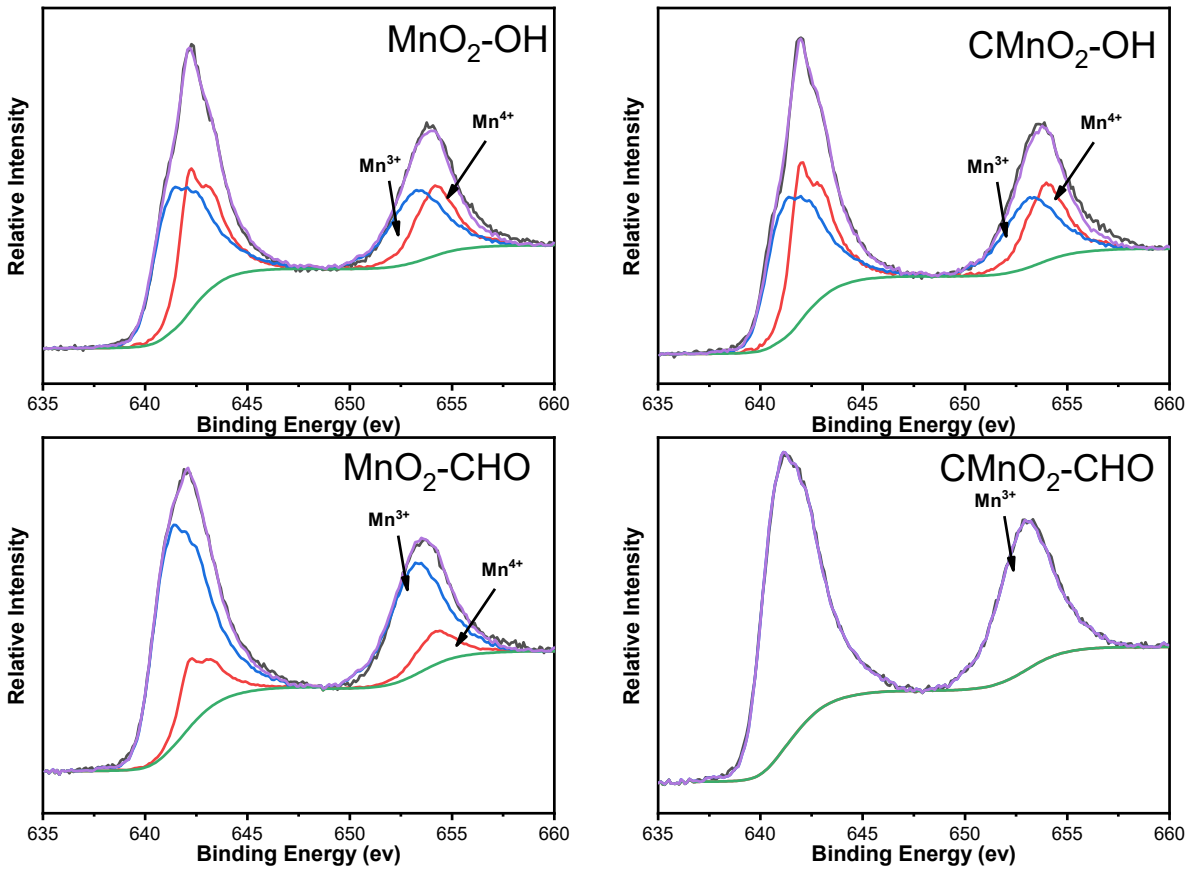

Figure S4: XPS Mn 2p of MnO_2-OH, $CMnO_2$-OH, MnO_2-CHO, and $CMnO_2$-CHO

Material	MnO_2-OH								
Core Peak	Mn 2p		O 1s			C 1s			K 2p
Component	Mn^{3+}	Mn^{4+}	O-Mn	O^-	O-C	C-C,C-H	C-O	C=O	
Binding Energy (eV)	641,4	642,2	529,8	531,4	532,8	285,0	286,2	288,6	292,8-295,6
Atomic %	11,2	8,5	36,4	8,1	1,8	18,7	2,5	2,8	10,1
Total Atomic %	19,7		46,3			24,0			10,1

Table S1: XPS composition table obtained for MnO_2-OH

Material	$CMnO_2$-OH								
Core Peak	Mn 2p		O 1s			C 1s			K 2p
Component	Mn^{3+}	Mn^{4+}	O-Mn	O^-	O-C	C-C,C-H	C-O	C=O	
Binding Energy (eV)	641,3	642,0	529,5	530,9	532,8	285,0	286,4	288,5	292,2-295,0
Atomic %	9,6	8,2	33,8	8,7	2,0	21,6	3,0	2,7	10,5
Total Atomic %	17,8		44,5			27,3			10,5

Table S2: XPS composition table obtained for $CMnO_2$-OH

Material	MnO_2-CHO								
Core Peak	Mn 2p		O 1s			C 1s			K 2p
Component	Mn^{3+}	Mn^{4+}	O-Mn	O^-	O-C	C-C,C-H	C-O	C=O	
Binding Energy (eV)	641,4	642,2	529,7	531,3	532,9	285,0	286,3	288,8	--
Atomic %	10,9	2,5	18,8	14,9	3,3	39,4	4,8	3,6	--
Total Atomic %	13,4		37,0			47,8			--

Table S3: XPS composition table obtained for MnO_2-CHO

Material	$CMnO_2$-CHO								
Core Peak	Mn 2p		O 1s			C 1s			K 2p
Component	Mn^{3+}	Mn^{4+}	O-Mn	O^-	O-C	C-C,C-H	C-O	C=O	292,7-295,5
Binding Energy (eV)	641,1	-	529,6	531,0	532,6	285,0	286,3	288,8	--1,5-1,5
Atomic %	17,6	-	27,5	10,3	4,6	31,3	2,6	2,2	--1,2
Total Atomic %	17,6		42,4			36,1			-1,2-

Table S4: XPS composition table obtained for $CMnO_2$-CHO

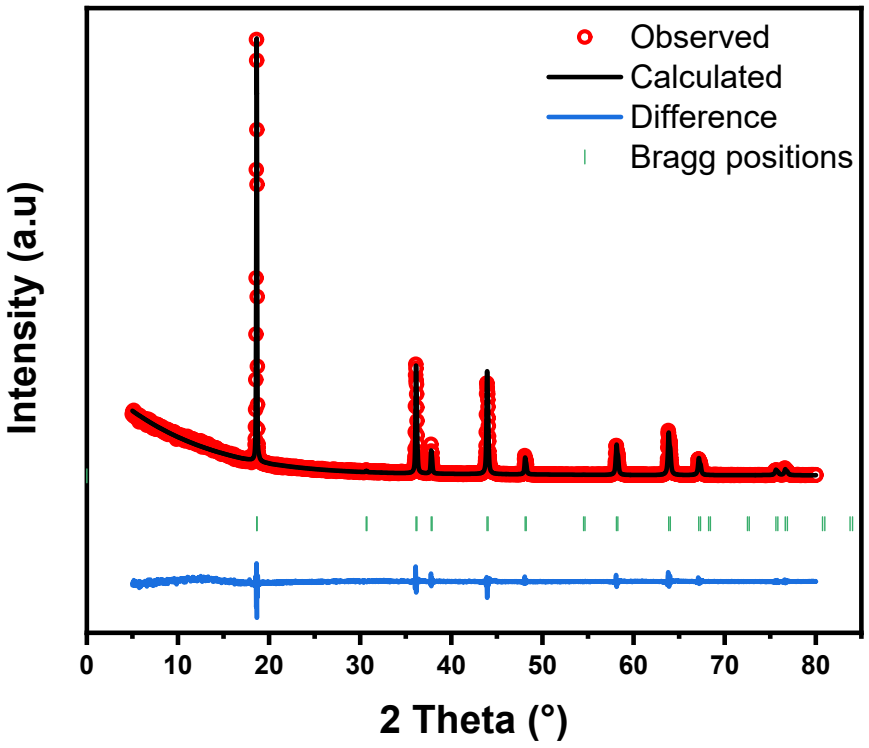

Figure S5: XRD Rietveld refinement of LMO-CHO

Table S5. Lattice and agreement parameters obtained after Rietveld refinement of LMO-CHO.

Lattice Parameters			***Refinement Parameters***		
a (Å)	***V (Å^3)***		***R_{wp}***	***R_{exp}***	***GoF***
8.23943	***559.360127***		***18.7***	***11.39***	***2.71***

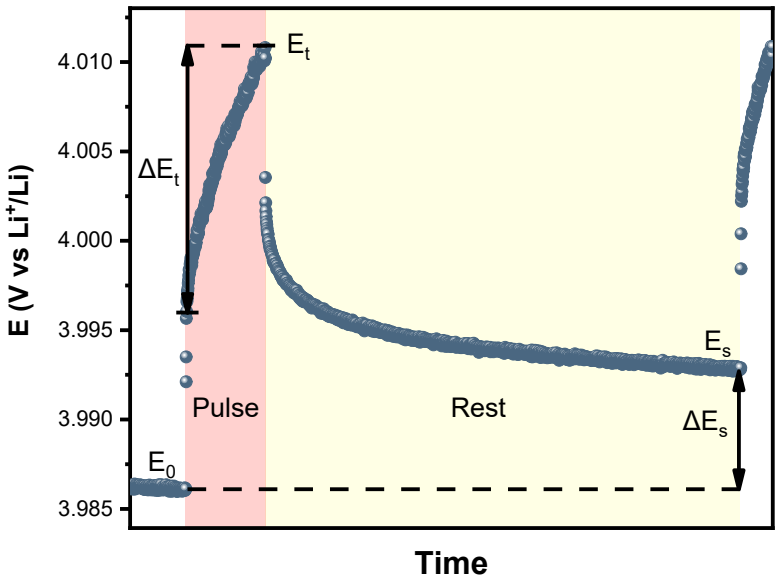

Figure S6. Schematic illustration for calculation of diffusion kinetics based on GITT curves