Supporting Information for

Facile synthesis of porous $LiMn_2O_4$ nano-cubes for ultra-stable lithium-ion battery cathodes

Haiyun Cheng, Caiyu Ma, Wenyao Li *

School of Materials Science and Engineering, Shanghai University of Engineering Science, Shanghai 201620, China

*Corresponding author, E-mail: liwenyao314@gmail.com

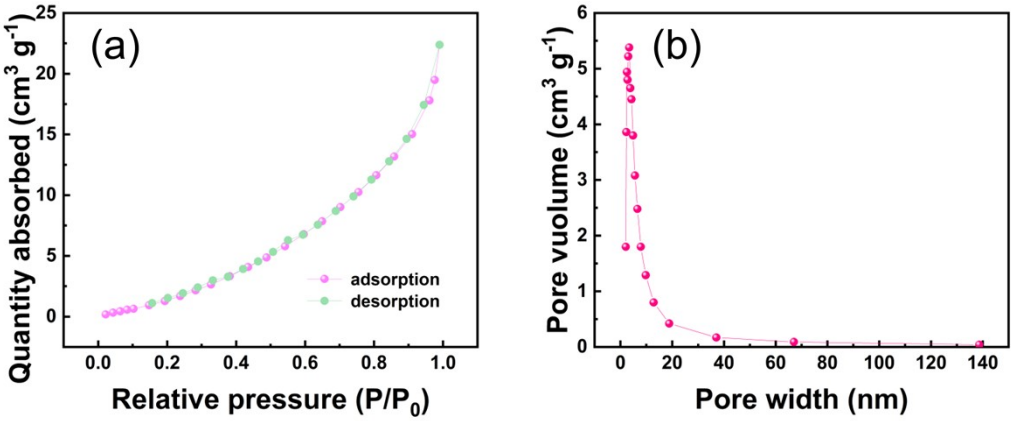

Fig. S1 (a) N2 adsorption-desorption isotherm of LMO; (b) Pore size distribution profiles

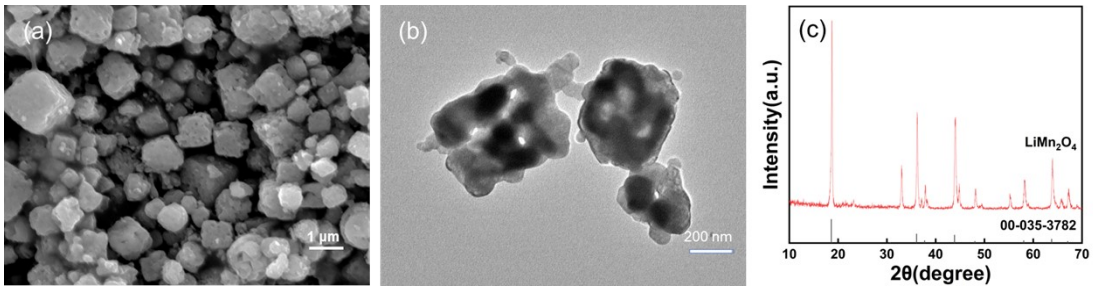

Fig. S2 (a) SEM, (b) TEM and (c) XRD of LMO after cycling

Table S1: Comparison of the cycling performance in this work with published literature

Active material	Synthesis route	Coating or doping	Charge-discharge rate (C)	Cycle number	Initial specific capacity (mAh g^{-1})	Capacity retention	Ref.
$LiNi_{0.5}Mn_{1.5}O_4$	microwave-assisted	coating and doping	0.1	100	132	95.3%	[1]
$LiNi_{0.02}Fe_{0.05}Mn_{1.93}O_4$	solid-state	doping	1	500	113.4	76.9%	[2]
Fe-$LiMn_2O_4$	solid-state	doping	0.3	200	89.2	89%	[3]
$LiMn_2O_4$	solid-state	none	1	100	115.7	68%	[4]
$LiMn_2O_4$	solid-state	none	1	100	128.7	86.2%	[5]
$LiMn_2O_4$	solid-state	none	0.2	50	119.1	87.2%	[6]
$LiMn_2O_4$@rGO	hydrothermal	coating	0.5	200	137.5	75%	[7]
$LiMn_2O_4$	solid state	none	0.2	100	129.8	95%	[8]
$Li_{0.09}K_{0.91}Mn_2O_4$	solid-state	doping	0.5	120	137	94.8%	[9]
$LiMn_2O_4$/graphene	solid-state	coating	10	160	121.9	82.9%	[10]
$LiMn_2O_4$	hydrothermal	none	0.1	50	120	84.1%	[11]
$LiMg_{0.05}Mn_{1.95}O_4$	molten-salt combustion	doping	1	100	122	86.4%	[12]
$Li_{1.05}Al_{0.02}Mn_{1.98}F_{0.02}O_{3.98}$	solid-state	doping	0.1	367	115.5	80%	[13]
$LiMn_2O_4$	precipitation-freeze drying	none	2	500	103.3	87.1%	[14]
$LiAl_{0.15}Mn_{1.85}O_4$	solid-state	doping	1	1000	103.3	72%	[15]
$LiMn_2O_4$	microwave synthesis	none	0.5	100	118.4	74.7%	[16]
$LiMn_2O_4$	solid-state	none	1	100	134	95.5%	[17]
$LiMn_2O_4$	homogeneous precipitation	none	0.1	100	112.5	92.5	[18]
$LiMn_2O_4$/graphene	solid-state	coating	1	500	111.5	＜80%	[19]
★This work	**solid-state**	**none**	**1**	**500**	**104**	**90.91%**	

References

1. Z. A. Qureshi, H. A. Tariq, H. M. Hafiz, R. A. Shakoor, S. AlQaradawi and R. Kahraman, *J. Alloys Compd.*, 2022, **920**, 165989.
2. Y. Ji, H. Liu, Y. Guo, J. Guo, M. Xiang, W. Bai, X. Liu and H. Bai, *Colloids Surf., A*, 2022, **648**, 129259.
3. S. N. Lee, D. H. Park, J. H. Kim, S. H. Moon, J. S. Jang, S. B. Kim, J. H. Shin, Y. Y. Park, and K. W. Park, *ChemElectroChem,* 2022, **9**, e202200385.
4. P. Li, S.h. Luo, X. Wang, L. Wang, J. Wang, F. Teng, Q. Wang, Y. Zhang, X. Liu, H. Zhang, J. Liang and X. Duan, *Sep. Purif. Technol.*, 2021, **278**, 119611.
5. Z. Chen, K. Huang, S. Liu and H. Wang, *Trans. Nonferrous Met. Soc. China*, 2010, **20**, 2309-2313.
6. X. Zhou, M. Chen, H. Bai, C. Su, L. Feng and J. Guo, *Vacuum*, 2014, **99**, 49-55.
7. Y. Chen, Y. Tian, Y. Qiu, Z. Liu, H. He, B. Li and H. Cao, *Mater. Today Adv.*, 2019, **1**, 100001.
8. Q. Jiang, H. Zhang and S. Wang, *Green Chem.*, 2016, **18**, 662-666.
9. L. Xiong, Y. Xu, X. Xiao, J. Wang and Y. Li, *Electron. Mater. Lett.*, 2015, **11**, 138-142.
10. Z. Li, X. Feng, L. Mi, J. Zheng, X. Chen and W. Chen, *Nano Res.*, 2018, **11**, 4038-4048.
11. X. Xiang, Z. Fu and W. Li, *J. Solid State Electrochem.*, 2013, **17**, 1201-1206.
12. J. Huang, F. Yang, Y. Guo, C. Peng, H. Bai, J. Peng and J. Guo, *Ceram. Int.,* 2015, **41**, 9662-9667.
13. P. Li, S. h. Luo, J. Wang, X. Wang, Y. Tian, H. Li, Q. Wang, Y. Zhang and X. Liu, *Int. J. Energ. Res.*, 2021, **45**, 21158-21169.
14. X. Li, L. Yu, Y. Zhang, H. Shao and W. Zhang, *Ionics*, 2019, **26**, 1591-1598.
15. S. Wang, M. Xiang, Y. Lu, J. Guo, C. Su, H. Bai and X. Liu, *J. Mater. Sci.: Mater. Electron*, 2020, **31**, 6036-6044.
16. X. Liu, P. Liu and H. Wang, *Ionics*, 2019, **25**, 5213-5220.
17. S. Xie, M. Yuan, T. Wang, J. Liu, J. Yan, Z. Li and J. Peng, *Ceram. Int.*, 2022, **48**, 10113-10119.
18. S. Dai, F. Zeng, J. Zhang, X. Li and Z. Shao, *Ionics*, 2021, **27**, 4233-4240.
19. Q. Ge, D. Wang, F. Li, D. Chen, G. Ping, M. Fan, L. Qin, L. Bai, G. Tian, C. Lv and K. Shu, *Russ. J. Electrochem.*, 2015, **51**, 125-133.