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Supporting Information

Mg-Ti co-doping behavior of porous $LiFePO_4$ microspheres for high-rate lithium-ion batteries

Jiguo Tu,[a,b] Kai Wu,[c] Hui Tang,[c] Henghui Zhou*[c] and Shuqiang Jiao*[a]

[a.] *State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing, Beijing, 100083, P.R. China. Email: sjiao@ustb.edu.cn; Tel. +86-10-62333617; Fax. +86-10-62333617*

[b.] *National Center for Materials Service Safety, University of Science and Technology Beijing, Beijing, 100083, P.R. China.*

[c.] *College of Chemistry and Molecular Engineering, Peking University, Beijing, 100871, P.R. China. Email: hhzhou@pku.edu.cn; Tel. +86-10-62757908; Fax. +86-10-62757908*

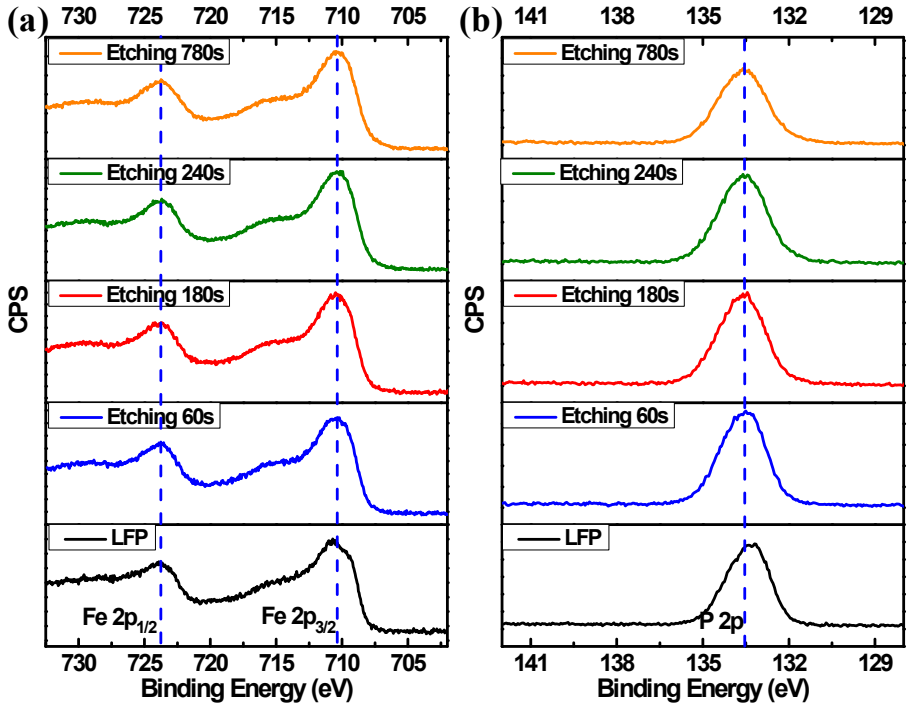

Fig. S1. XPS spectra of Fe 2p (a) and P 2p (b) of LFP microspheres over different etching times.

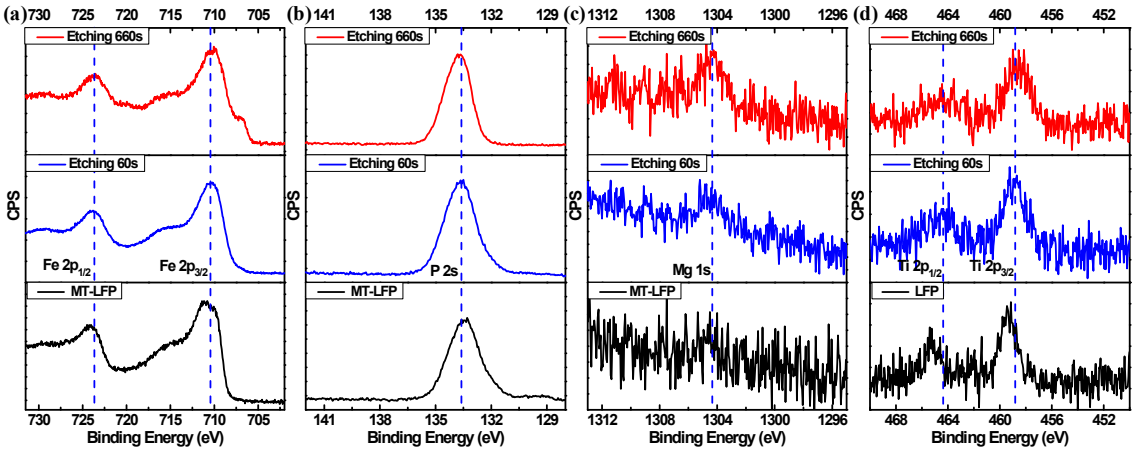

Fig. S2. XPS spectra of Fe 2p (a), P 2p (b), Mg 1s (c) and Ti 2p (d) of MT-LFP microspheres over different etching times.

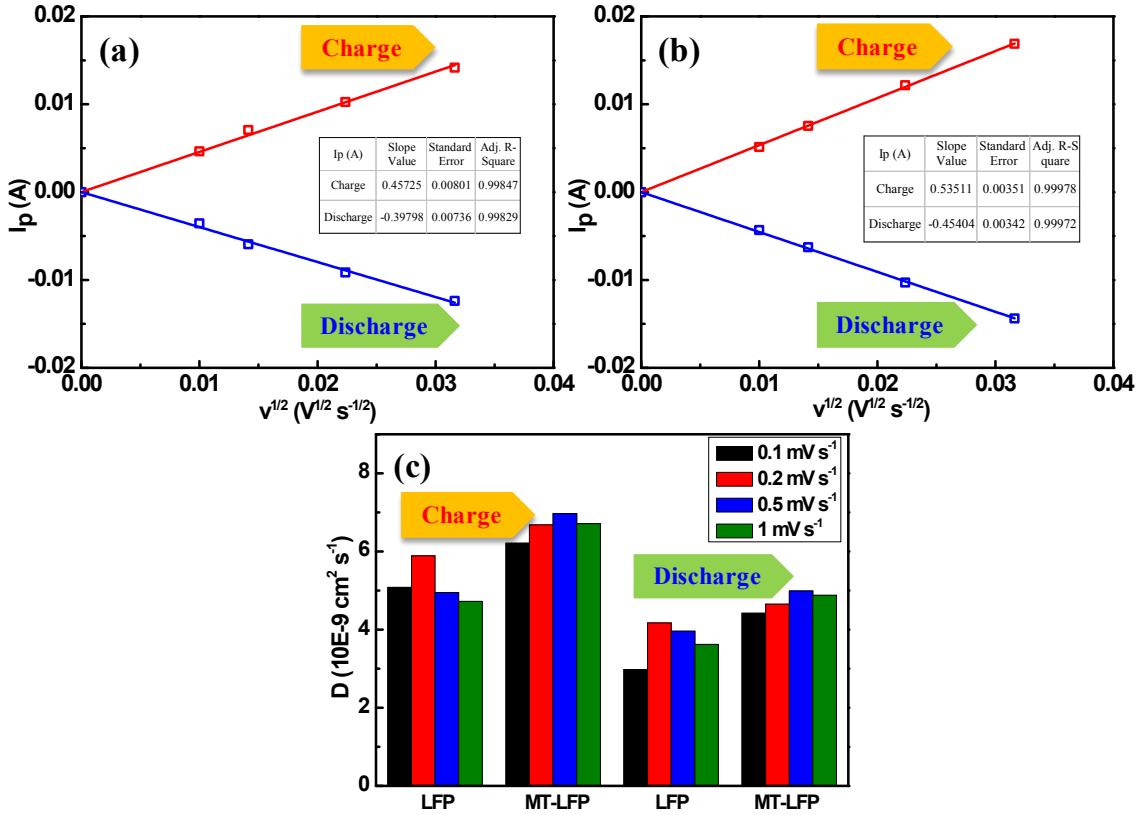

Fig. S3. The linear fitting curves of I_p-$v^{1/2}$ of the as-prepared LFP (a) and MT-LFP (b), and the histogram of Li-ion diffusion coefficients of LFP and MT-LFP cathode during the charge and discharge process with different scan rates (c).

Table S1. Lattice parameters and unit cell volume of the LFP and MT-LFP samples.

Samples	*a* (Å)	*b* (Å)	*c* (Å)	Volume (Å^3)
LFP	10.3274	6.0065	4.6915	291.02
MT-LFP	10.3259	6.0057	4.6916	290.95

Table S2. The atomic ratio of primary orbital peak of undoped $LiFePO_4$ microspheres under different etching time.

Etching time (s)	O 1s	Fe 2p3/2	P 2p
0	73.16	7.95	18.99
60	69.68	10.08	20.24
180	68.01	11.31	20.68
240	66.65	12.74	20.61
780	65.55	13.67	20.78

Table S3. The atomic ratio of primary orbital peak of Mg-Ti co-doped $LiFePO_4$ microspheres under different etching time.

Etching time (s)	O 1s	Fe 2p3/2	P 2p	Mg 1s	Ti 2p3/2
0	68.37	9.28	21.66	0.37	0.30
60	63.12	14.94	21.20	0.47	0.27
660	60.82	17.29	20.84	0.72	0.33

Table S4. The Li-ion diffusion coefficients of the as-prepared LFP and MT-LFP cathodes at different scan rates.

Samples		0.1 mV s^{-1}	0.2 mV s^{-1}	0.5 mV s^{-1}	1 mV s^{-1}
LFP	Charge	5.08E-9	5.89E-9	4.95E-9	4.72E-9
	Discharge	2.98E-9	4.17E-9	3.96E-9	3.62E-9
MT-LFP	Charge	6.21E-9	6.68E-9	6.97E-9	6.71E-9
	Discharge	4.42E-9	4.65E-9	4.99E-9	4.88E-9