

# **Economic synthesis of sub-micron brick-like Al-MOF with designed pore distribution for lithium-ion batteries anode with high initial Coulombic efficiency and cycle stability**

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Fig. S1 SEM images of all Al-MOF samples

Fig. S2 XPS C 1s spectra distribution for different etching levels

Fig. S3 Attenuation rate from 1st to 100th cycles

Fig. S4 Cyclic voltammetry curve after 400 cycles at 0.2 A/g

Fig. S5 (a) Nyquist plots and (b) the linear fits in the low-frequency region of all Al-MOF samples after 100 cycles at 0.1 A/g

Fig. S6 Electrode sheet SEM images

Table S1 Electrochemical performance for all Al-MOF samples

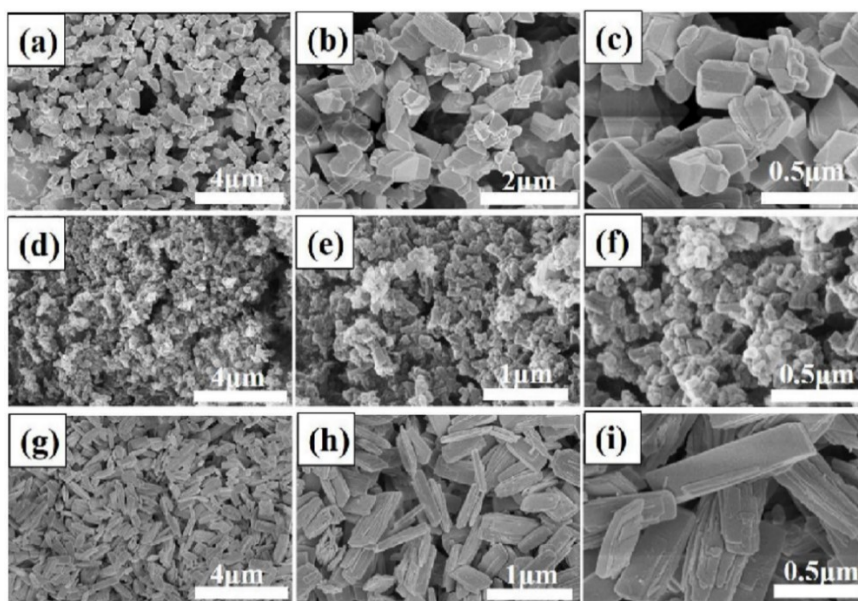


Fig. S1 SEM images of (a-c) Al-MOF1, (d-f) Al-MOF2 and (g-i) Al-MOF3.

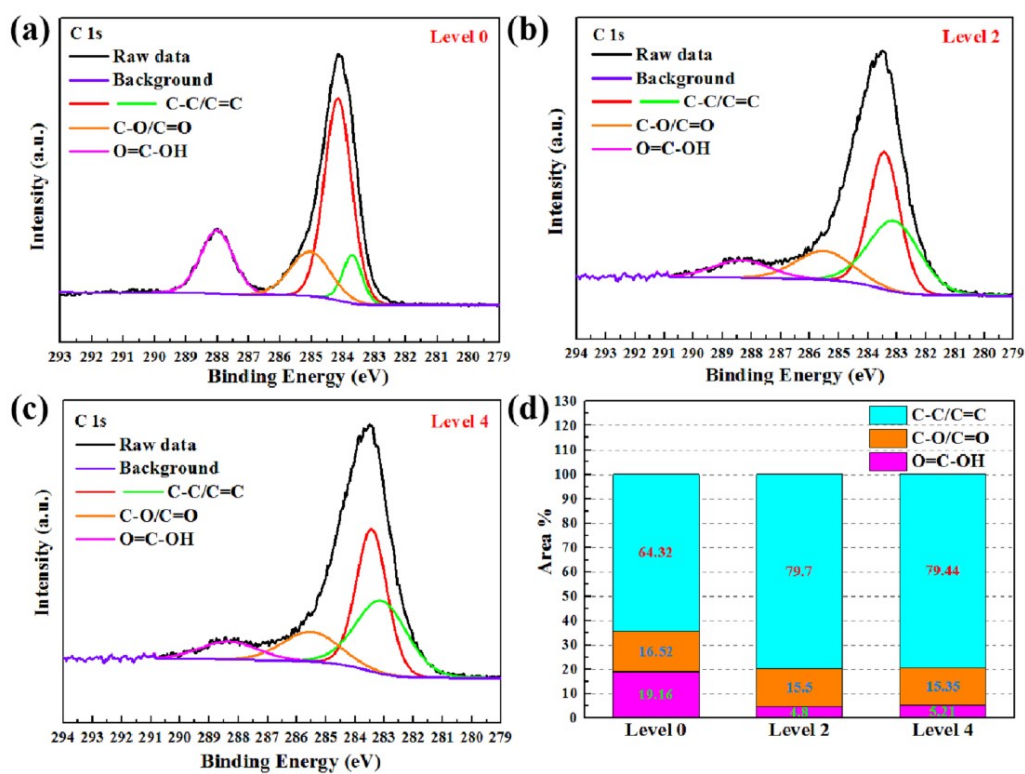


Fig. S2 XPS C 1s spectra at (a) Level 0, (b) Level 2, (c) Level 4 and (d) The composition and proportion changes of valence state of C.

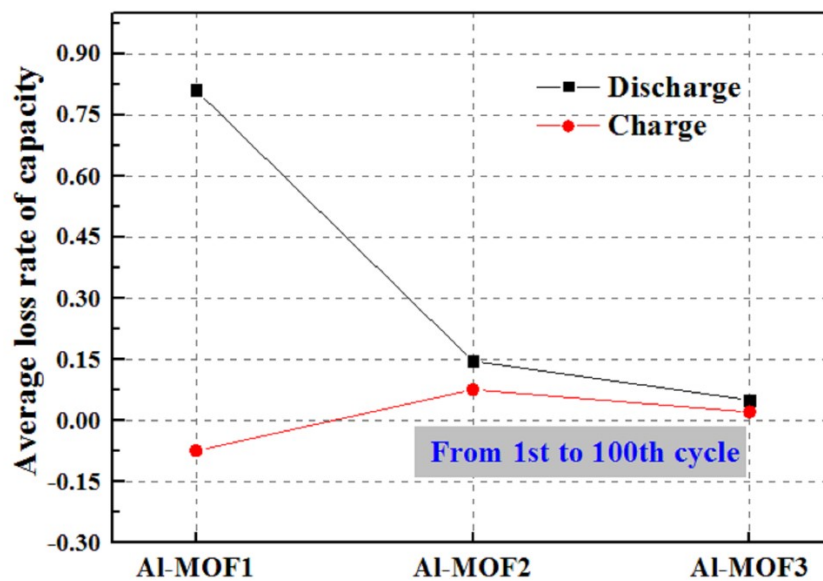


Fig. S3 Attenuation rate from 1st to 100th cycles.

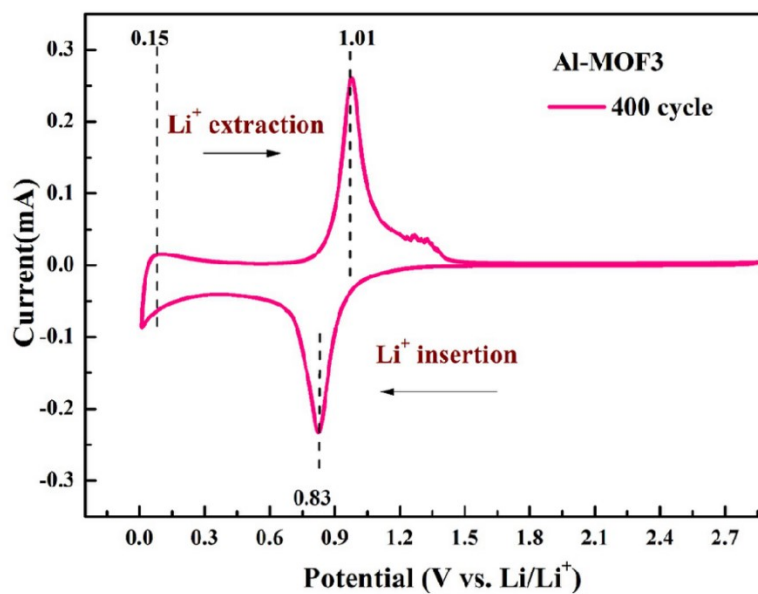


Fig. S4 Cyclic voltammety curve after 400 cycles at 0.2 A/g.

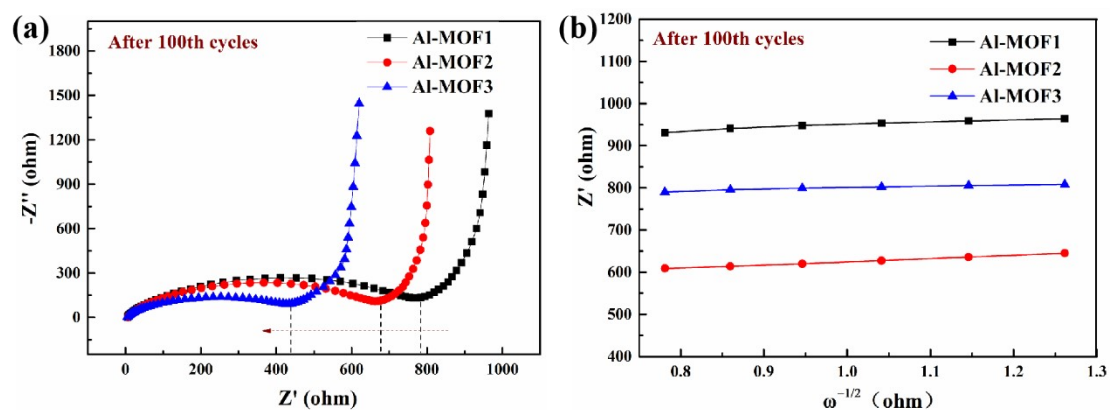


Fig. S5 (a) Nyquist plots and (b) the linear fits in the low-frequency region of all Al-MOF samples after 100 cycles at 0.1 A/g

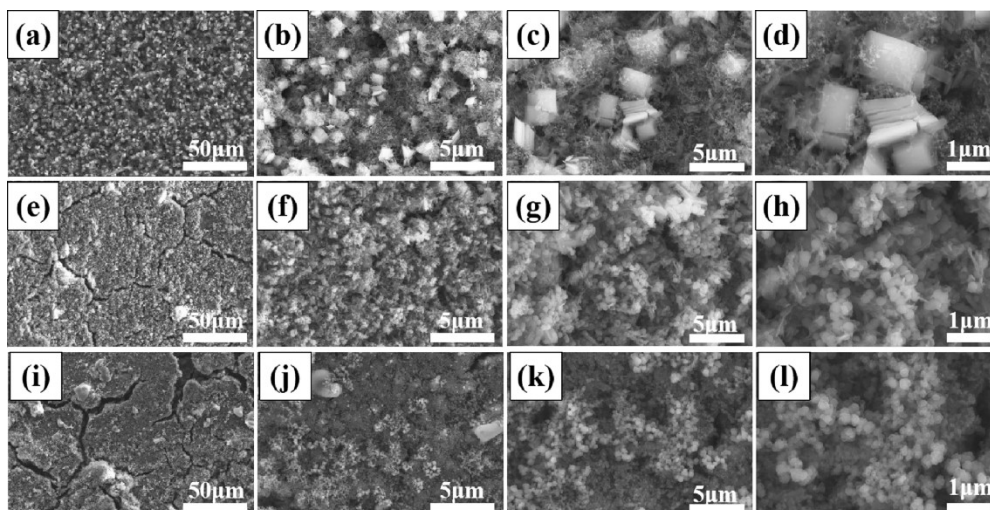


Fig. S6 Electrode sheet SEM images of (a-d) Fresh state, (e-h) After 100th cycles and (i-l) After 70th rate test of Al-MOF3

Table S1. Electrochemical performance for all Al-MOF samples

Samples	Current density (A/g)	1 <sup>st</sup> charge capacity (mAh/g)	1 <sup>st</sup> discharge capacity (mAh/g)	Initial Coulombic efficiency (%)	Discharge attenuation rates after cycles (%)
Al-MOF1	0.1	117.2	696.8	16.8	0.812 (100 cycles)
Al-MOF2	0.1	186.1	202.2	92.0	0.147 (100 cycles)
Al-MOF3	0.1	379.2	392.4	96.6	0.051 (100 cycles)
	0.2	383.8	397.8	96.5	0.103 (400 cycles)
	2.0	139.5	159.9	87.2	0.110 (400 cycles)