Electronic supplementary information (ESI)

Mesoporous nanostructured Co_3O_4 derived from MOF template: a high-performance anode material for lithium-ion batteries

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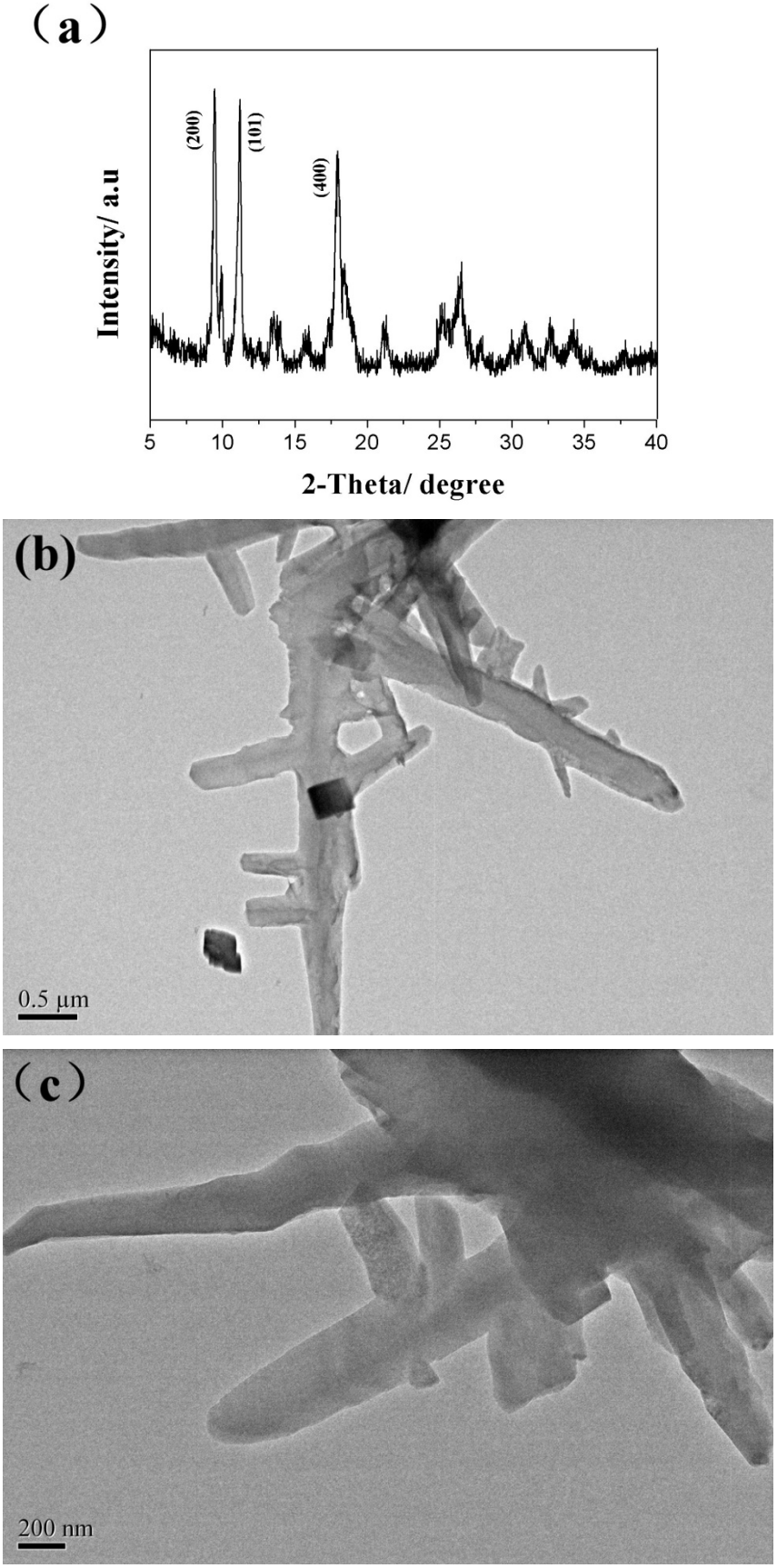

Fig.S1 (a) XRD pattern of MOF-71 prepared from hydrothermal process. (b and c) TEM image of MOF-71 with two different scales.

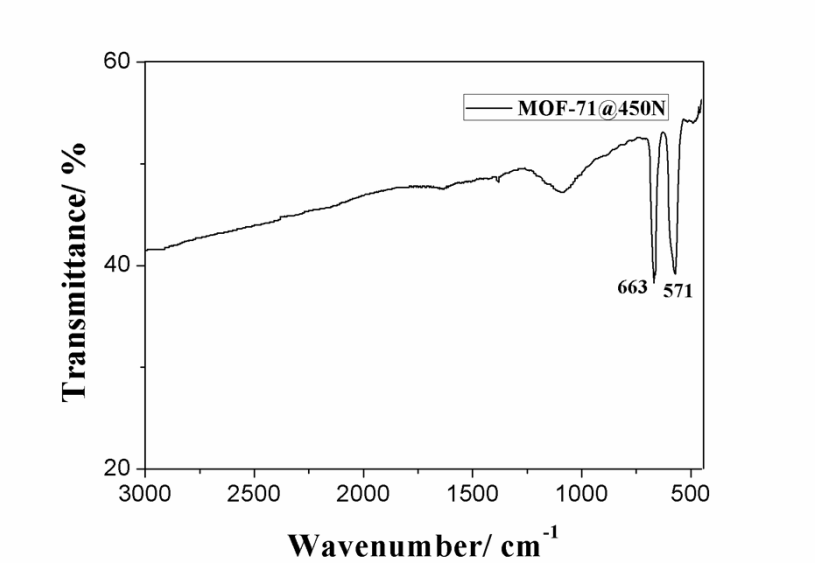

Fig. S2 FT-IR spectrum of MOF-71@450N .

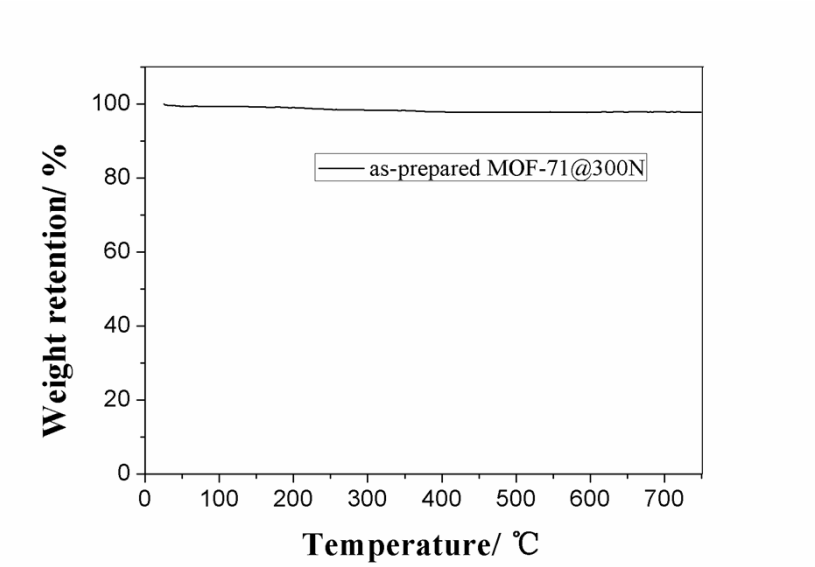

Fig. S3 TG curve of MOF-71@300N under air atmosphere.

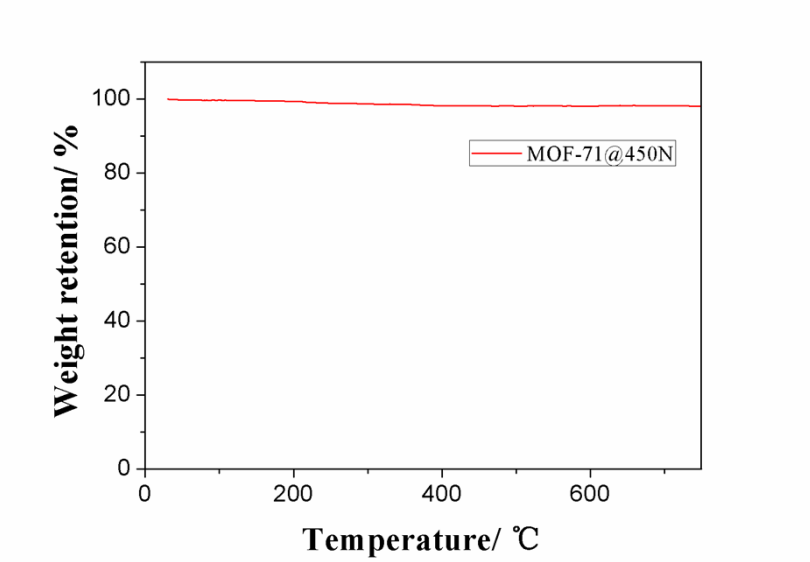

Fig. S4 TG curve of MOF-71@450N under air atmosphere.

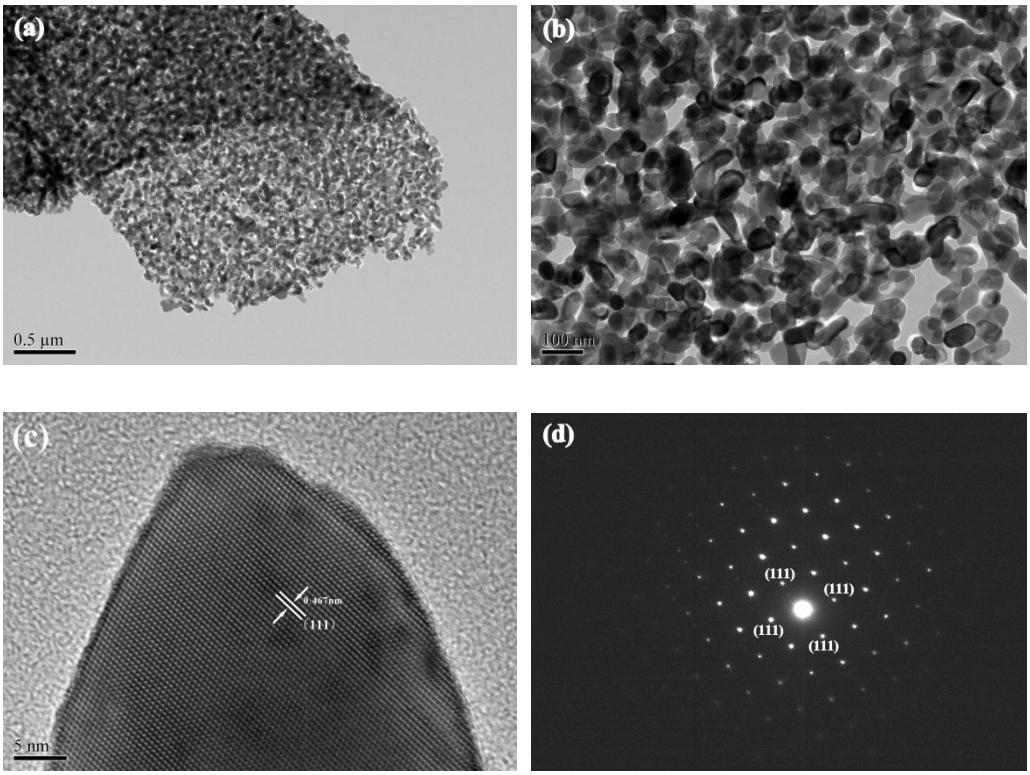

Fig. S5 (a) Low-magnification TEM image of MOF-71@450N materials. (b) High magnification TEM image of MOF-71@450N. (c) Lattice resolved TEM image of MOF-71@450N. (d) The SAED patterns taken from (c).

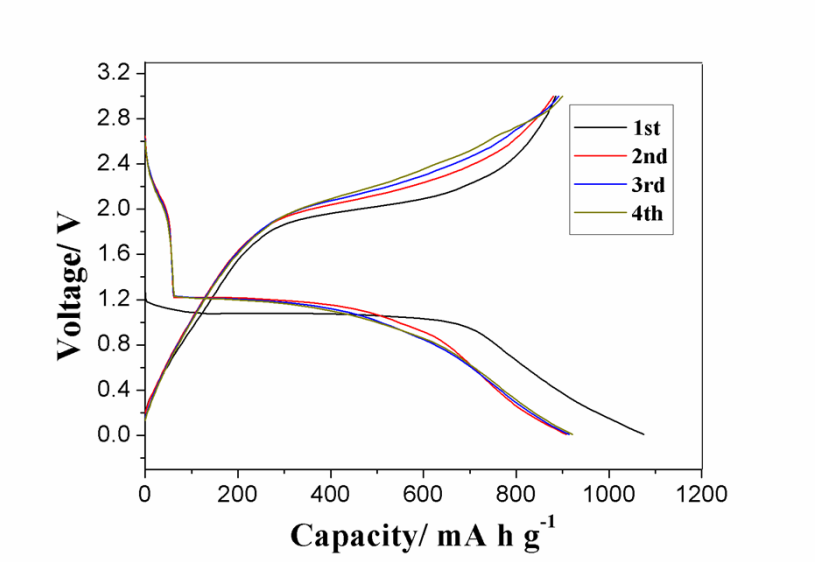

Fig. S6 Representative charge/discharge volatge profiles of MOF-71@450N anode at a current density of 200mA g^{-1}, from which more prominent plateaus compared with MOF-71@300N were observed.

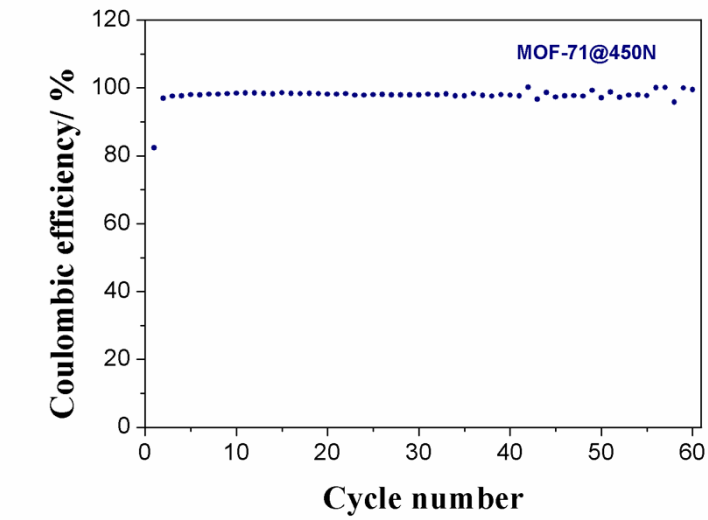

Fig. S7 Coulombic efficiencies of MOF-71@450N anode when cycling at 200mA g^{-1}, from which a higher Coulombic efficiency of 82.34% in the 1st cycle compared with MOF-71@300N and nearly 100% Coulombic efficiency after 2nd cycle were observed.

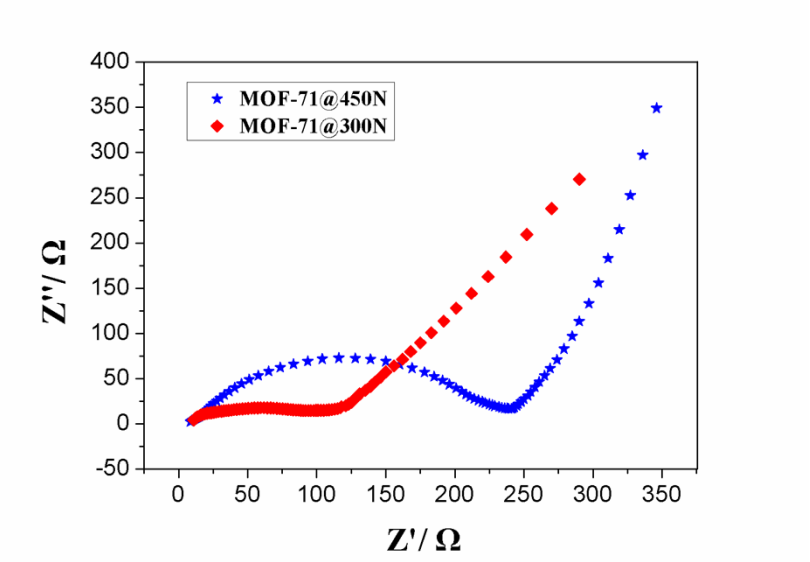

Fig. S8 Nyquist plots for MOF-71@300N and MOF-71@450N at 30th cycles with 200 mA g^{-1}.

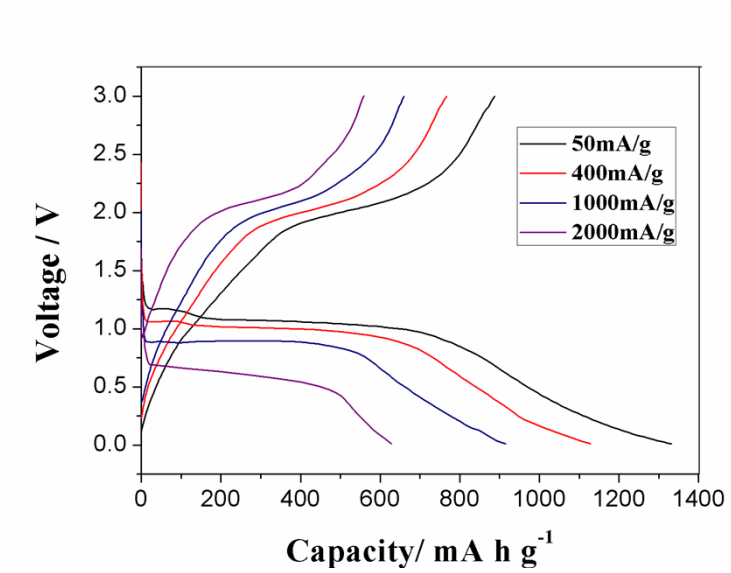

Fig. S9 The charge/discharge profiles in the first cycle of MOF-71@300N anode at different current rates, from which lower voltage platforms were shown at higher current rates for the discharge curves.

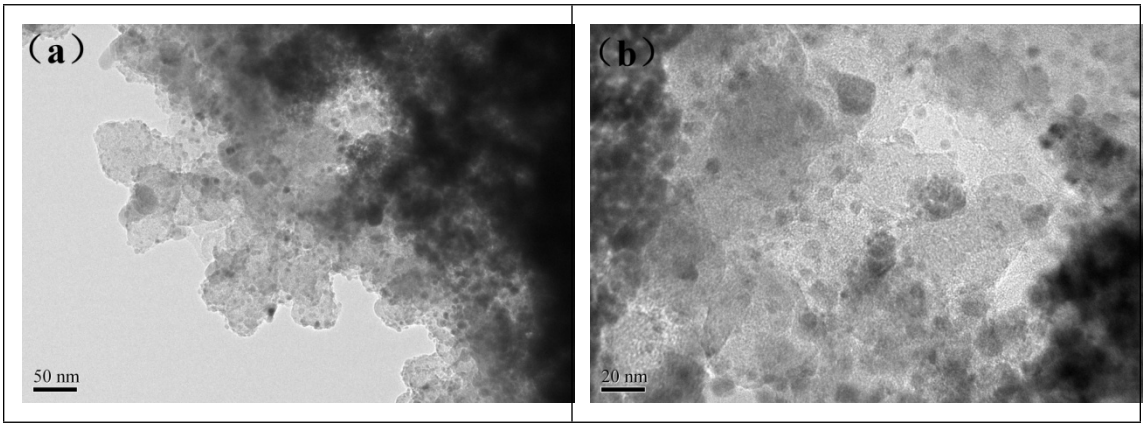

Fig.S10 (a and b) Ex-situ TEM images of MOF-71@300N electrodes taken from the fully charged states after 30 cycles with 200 mA g^{-1}.

Table S1. Surface areas, pore volumes and mean pore diameters of MOF-71@300N and MOF-71@450N.

Sample	Surface area (m^2 g^{-1})	Pore volume (cm^3 g^{-1})	Mean pore diameter (nm)
MOF-71@300N	59.0	0.4483	30.389
MOF-71@450N	16.2	0.0619	15.253

Table S2. Cycling performance of Co_3O_4 as anode material under similar conditions in recent papers.

Sample	Rate (mA g^{-1})	Retention capacity (mA h g^{-1})	Cycle number	Ref.
Mesoporous Co_3O_4 nanobelts	177	770	25	[13]
Double-shell Co_3O_4 hollow sphere	178	866	50	[17]
porous Co_3O_4 hollow rods	240	903	20	[45]
Mesoporous Co_3O_4 nanowires	300	810	30	[12]
Co_3O_4 nanomesh	300	800	50	[46]
Our work	200	913	60	-