Supporting Information

Boosting interface reaction activity and kinetics of cobalt molybdate by phosphating treatment for aqueous zinc-ion batteries with high energy density and long cycle life

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Calculation principles:

The specific capacity (mA h g^{-1}) is calculated according to the equation: C = i × Δt/m, where i (mA) is the applied discharging current, Δt (h) is the discharging time, and m (g) is the mass loading of active material. The energy density (W h kg^{-1}) and power density (W kg^{-1}) are estimated based on the formulas: $E = \int_0^{\Delta t} \frac{V \times i}{m} dt$ and P = E/t, where V (V), i (mA), Δt (h) and m (g) represent the working voltage, discharging current, discharging time of the assembled batteries, and mass loading of active material on the cathode, respectively.

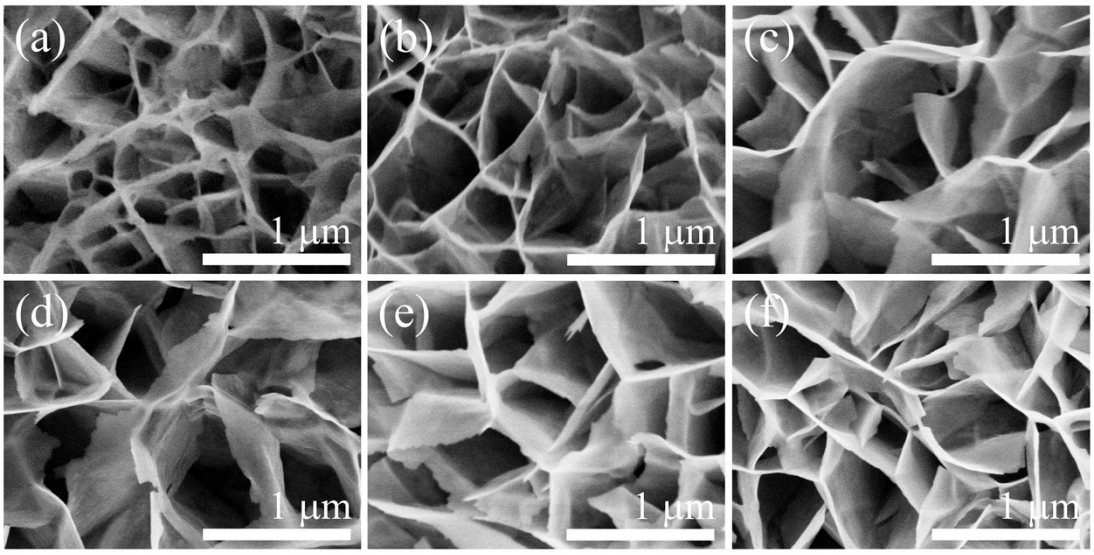

Fig. S1 SEM images of $CoMoO_4$ samples after phosphating treatment at (a) 300 ℃, (b) 350 ℃ and (c) 450 ℃ for 2h. SEM images of $CoMoO_4$ samples after phosphating treatment at 400 ℃ for (d) 0.5 h, (e) 1 h and (f) 5 h.

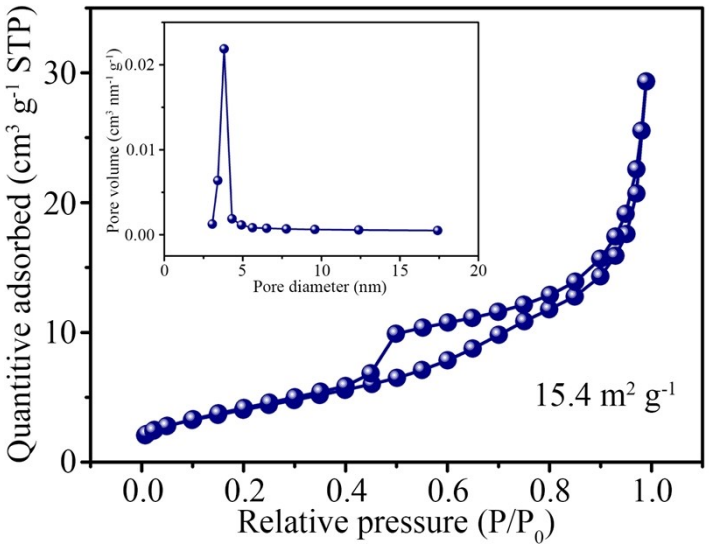

Fig. S2 N_2 adsorption/desorption isotherm and pore-size distribution curve (inset) of $CoMoO_4$ sample.

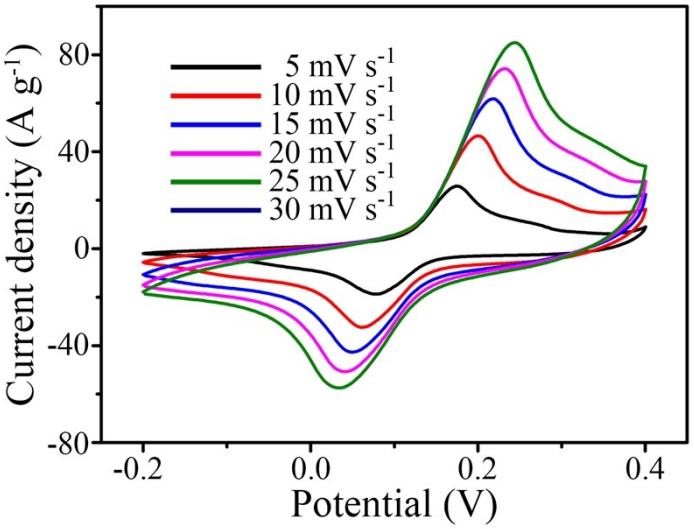

Fig. S3 CV curves of $CoMoO_4$ electrode at different scan rates.

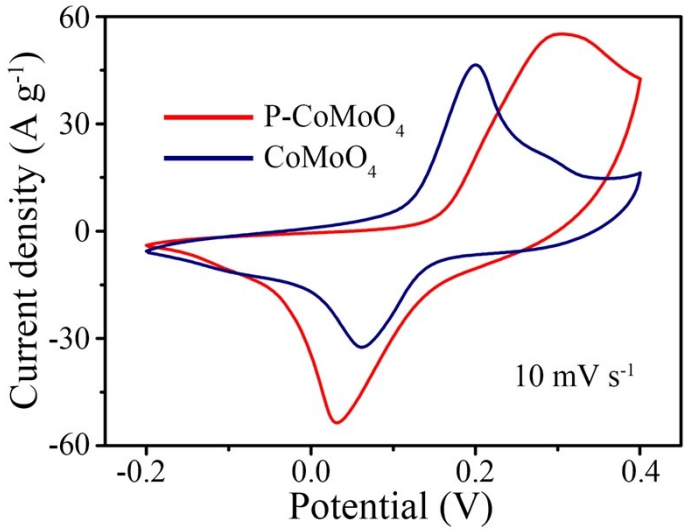

Fig. S4 The comparison of CV curves for $CoMoO_4$ and P-$CoMoO_4$ electrodes at 10 mV s^{-1}.

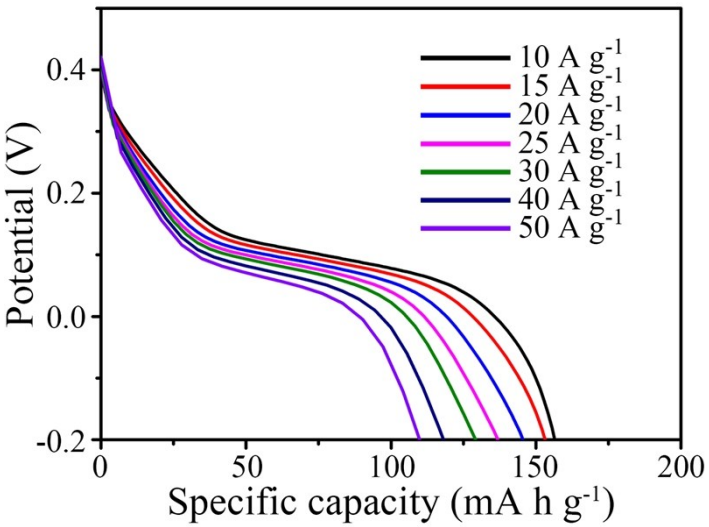

Fig. S5 Discharge curves of $CoMoO_4$ electrode at different current densities.

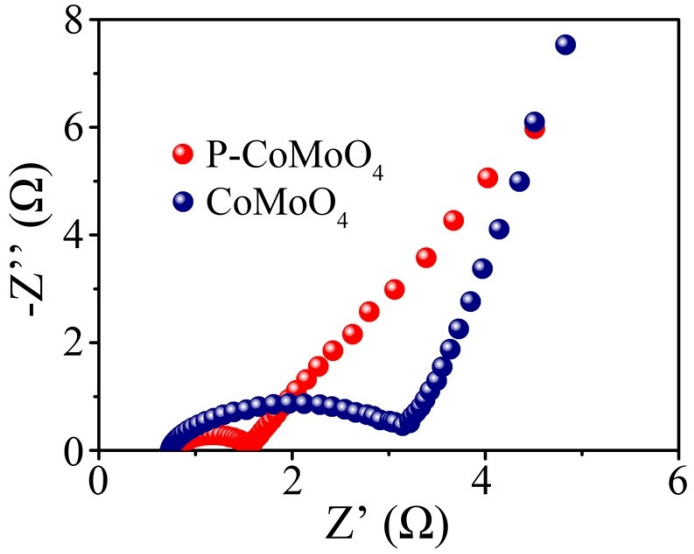

Fig. S6 Nyquist plots of $CoMoO_4$ and P-$CoMoO_4$ electrodes.

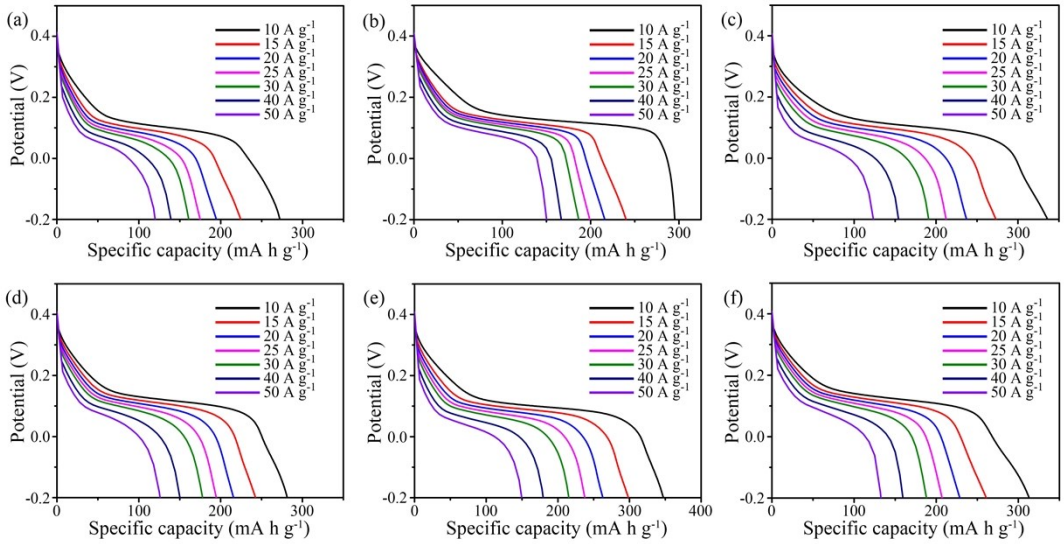

Fig. S7 Discharge curves of $CoMoO_4$ electrodes after phosphating treatment at (a) 300 ℃, (b) 350 ℃ and (c) 450 ℃ for 2h. Discharge curves of $CoMoO_4$ electrodes after phosphating treatment at 400 ℃ for (d) 0.5 h, (e) 1 h and (f) 5 h.

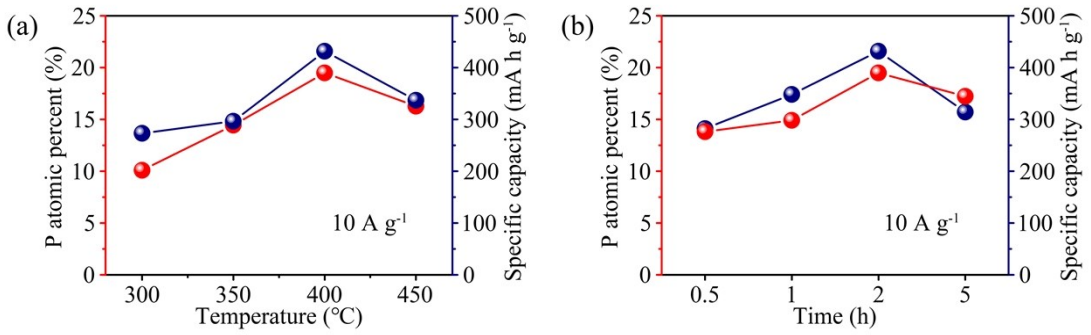

Fig. S8 Relationship of specific capacity versus P atomic percent after phosphating treatment (a) at different temperature for 2h, and (b) at 400 ℃ for different holding time.

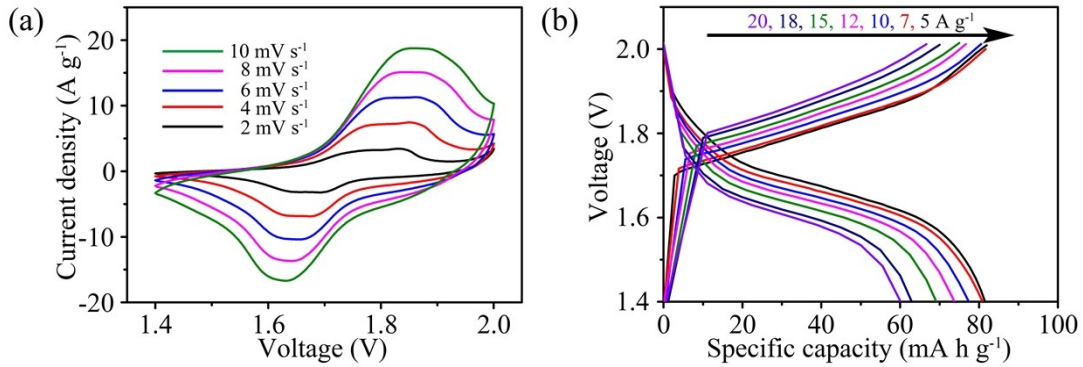

Fig. S9 (a) CV curves of $CoMoO_4$//Zn battery at different scan rates. (b) GCD curves of $CoMoO_4$//Zn battery at different current densities.

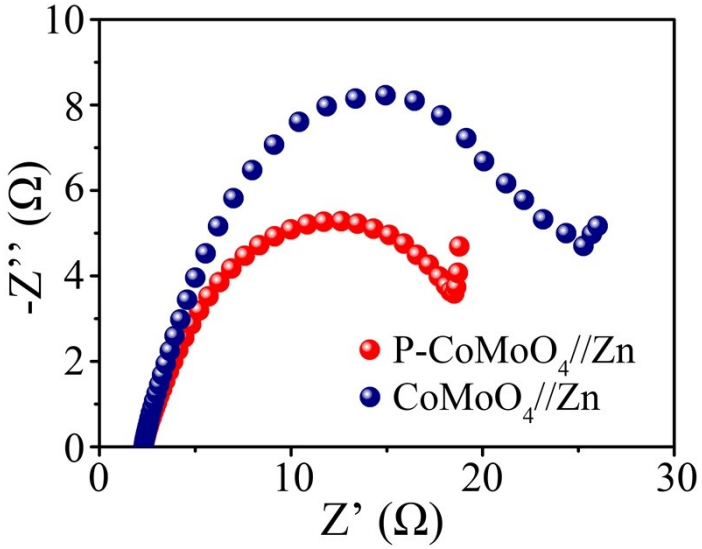

Fig. S10 Nyquist plots of $CoMoO_4$//Zn and P-$CoMoO_4$//Zn batteries.