Electronic Supporting Information

Dicyandiamide assisted synthesized N-doped porous CoMn-Nx@N-C carbon nanotube composites via MOFs as efficient trifunctional electrocatalysts in the same electrolyte

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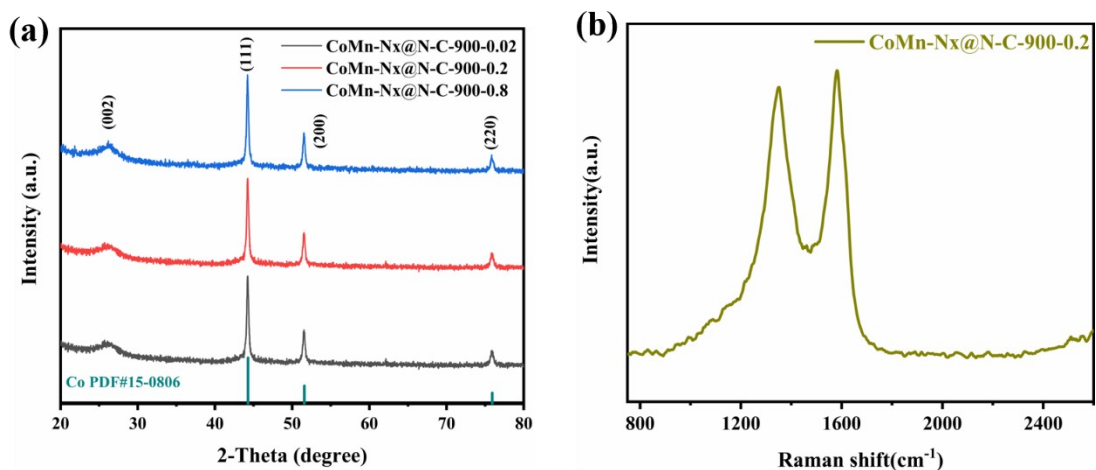
Fig. S1. (a) XRD spectra of CoMn-Nx@N-C-900-0.02, CoMn-Nx@N-C-900-0.2 and CoMn-Nx@N-C-900-0.8 nanocomposites; (b) Raman spectra of CoMn-Nx@N-C-900-0.2.
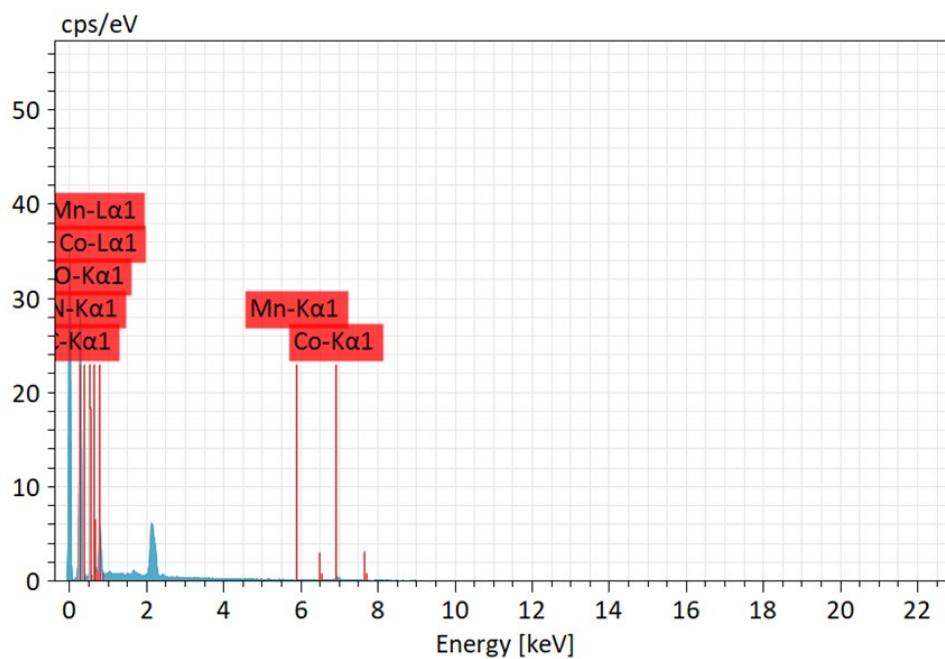

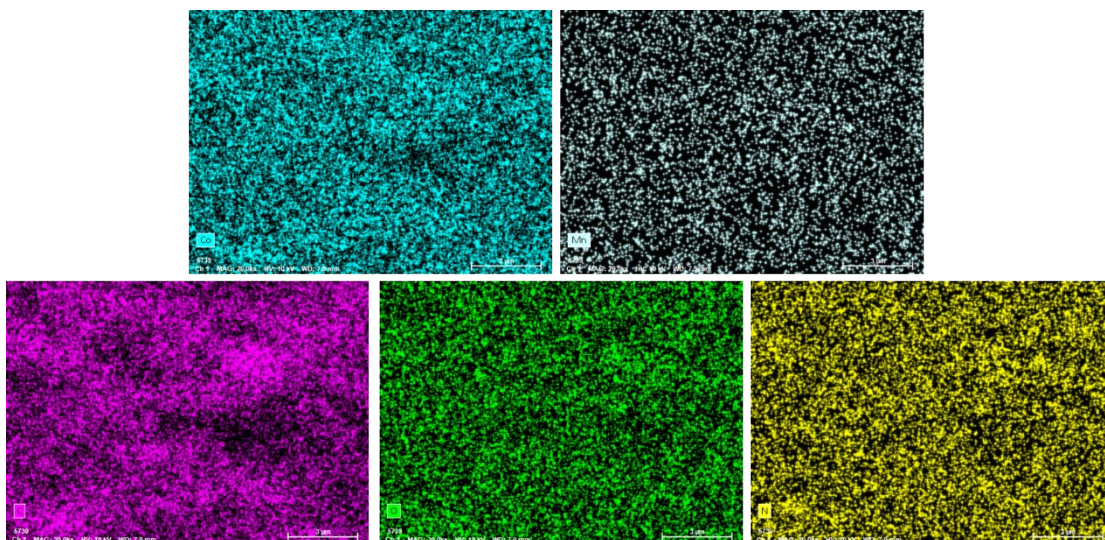**Fig. S2.** The EDS spectra of CoMn-Nx@N-C-900-0.2.

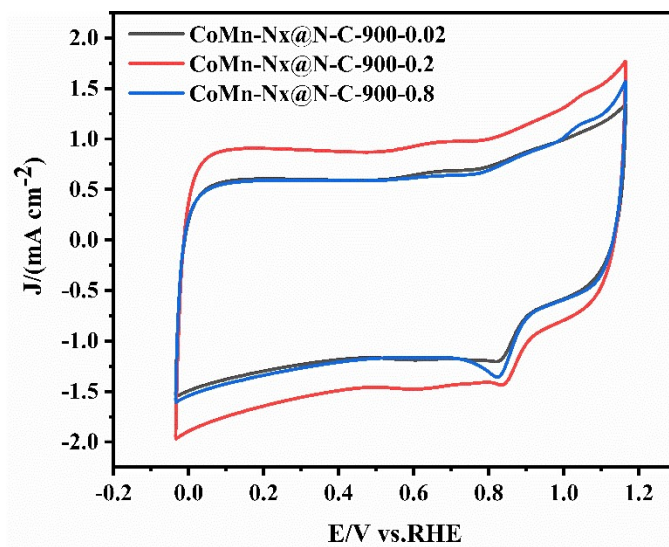**Fig. S3.** elemental mapping images of CoMn-Nx@N-C-900-0.2.

Fig. S4. CV curves of CoMn-Nx@N-C-900-0.02, CoMn-Nx@N-C-900-0.2 and CoMn-Nx@N-C-900-0.8 nanocomposites in 0.1 KOH.
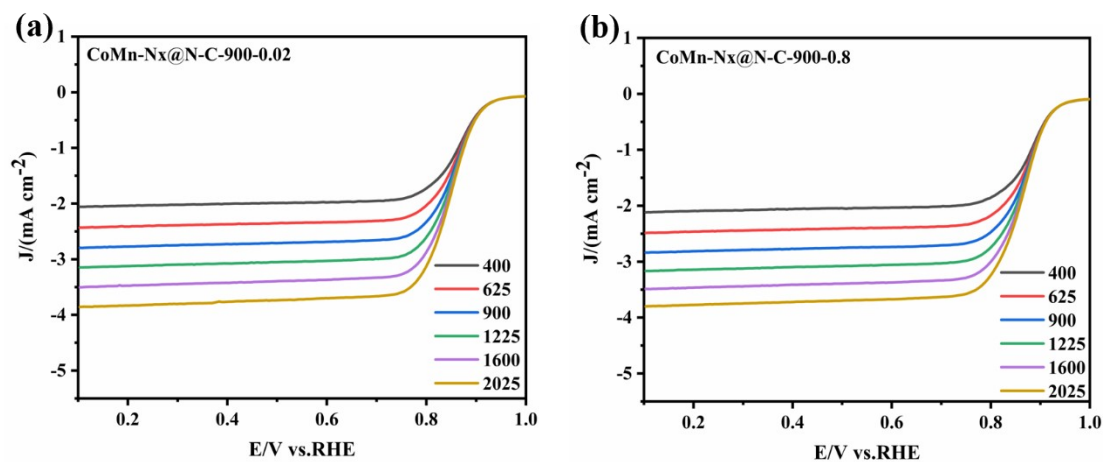
Fig. S5. LSV diagram of CoMn-Nx@N-C at different rotation rates of (a) CoMn-Nx@N-C-900-0.02; (b) CoMn-Nx@N-C-900-0.8.
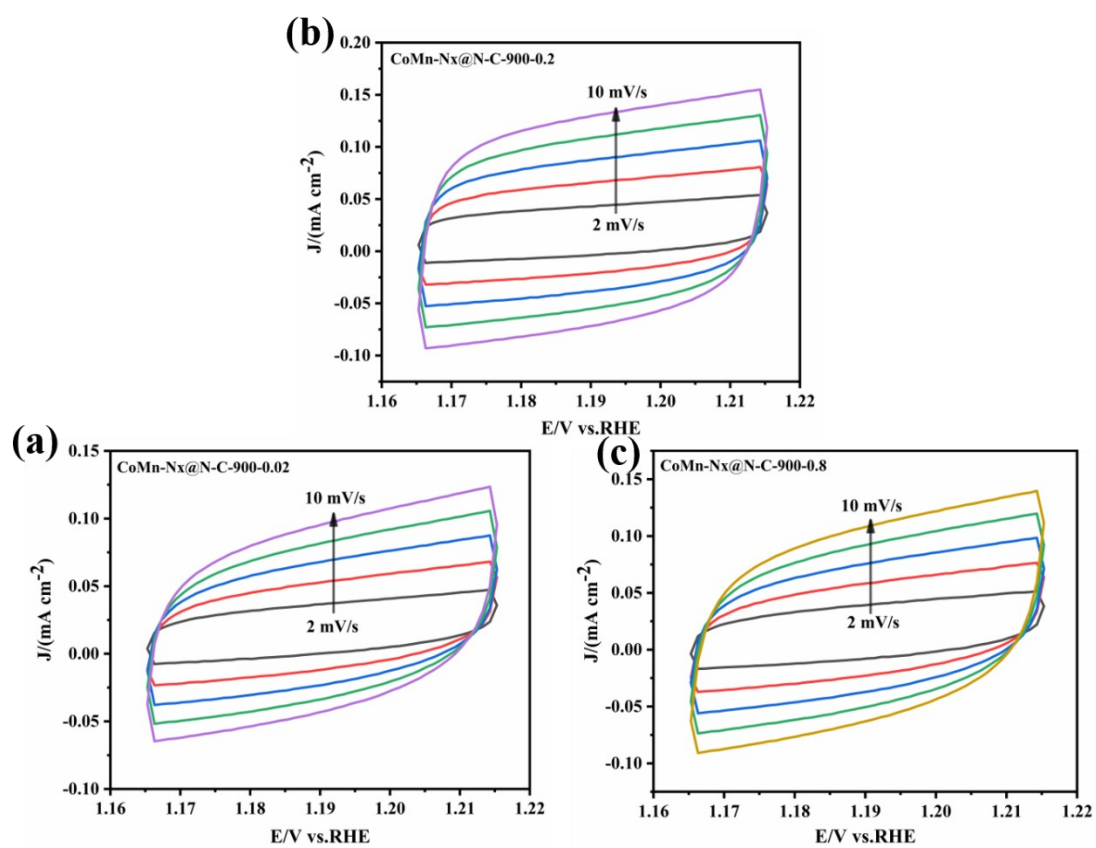

Fig. S6. CV curves measured at different scan rates from 2 to 10 mV s^{-1} of (a) CoMn-Nx@N-C-900-0.02; (b) CoMn-Nx@N-C-900-0.2; (c) CoMn-Nx@N-C-900-0.8.

Table S1. Summary of Porosity Parameters of CoMn-Nx@N-C-900-0.2.

Electrocatalyst	BET SSA (m^2g^{-1})	Pore volume (cm^3g^{-1})
CoMn-Nx@N-C-900-0.2	134.50	0.265