Supporting Information

Self-templated construction of hollow trimetallic MnNiCoP yolk-shell spheres assembled with nanosheets as a satisfactory electrode material for hybrid supercapacitors

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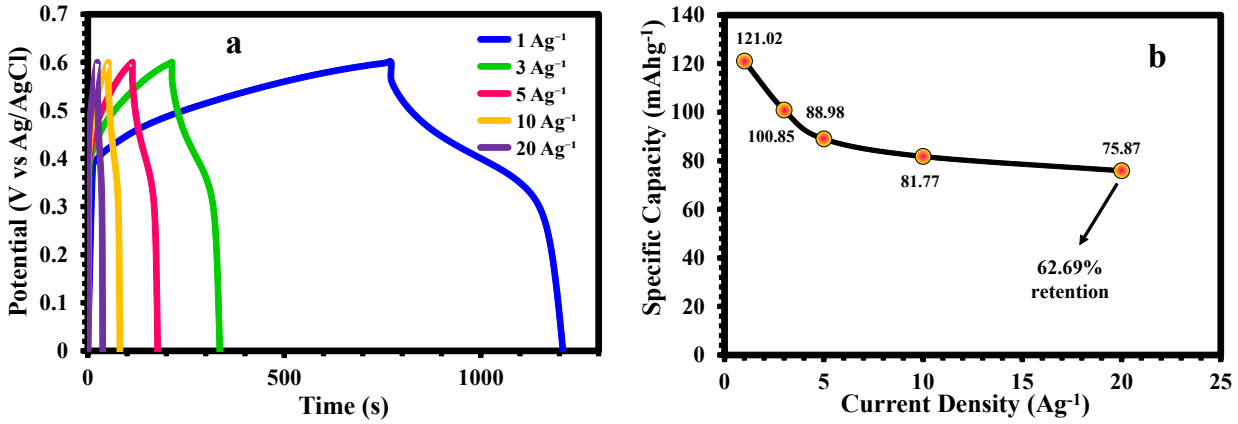

Fig. S1 (a) GCD profiles of the MnNiCo-LDH@NiF electrode at different current densities (b) Rate performance of the MnNiCo-LDH@NiF electrode.

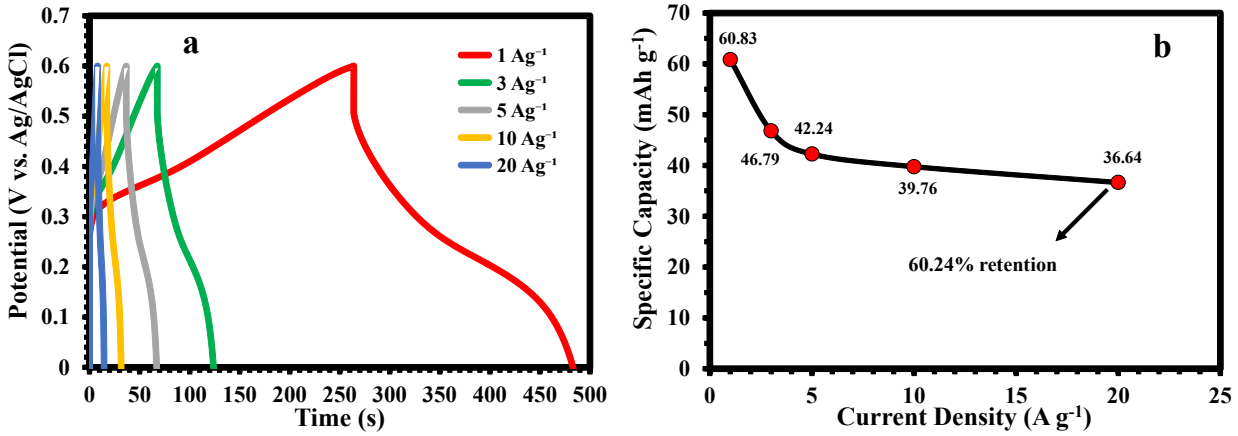

Fig. S2 (a) GCD profiles of the NiCo-gly@NiF electrode at different current densities (b) Rate performance of the NiCo-gly@NiF electrode.

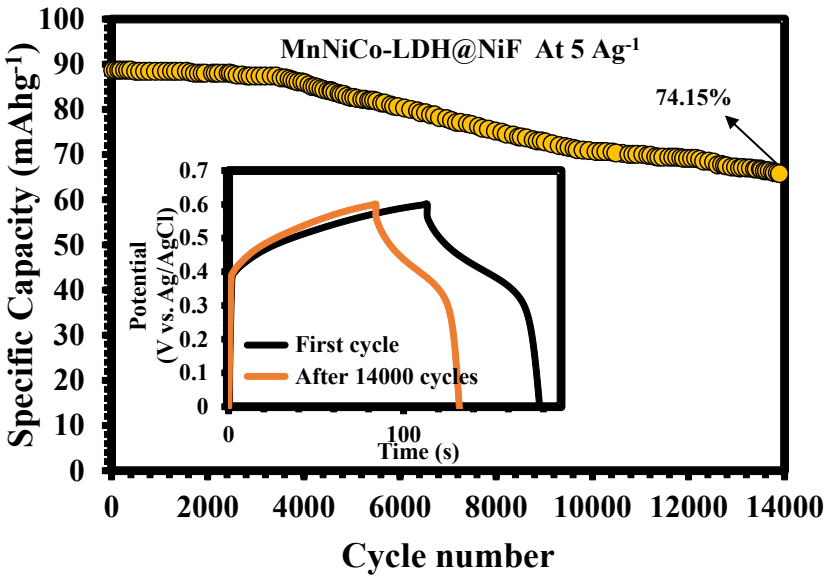

Fig. S3 Durability of the MnNiCo-LDH@NiF electrode at 5 Ag^{-1}.

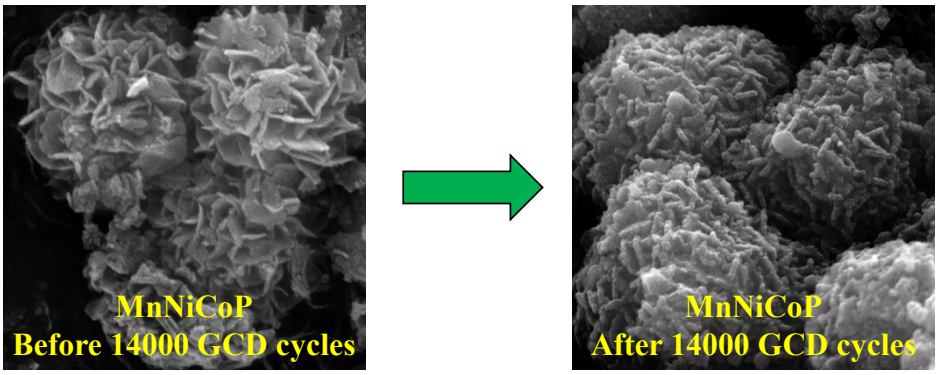

Fig. S4 FE-SEM images of the MnNiCoP electrode material after 14,000 GCD cycles.

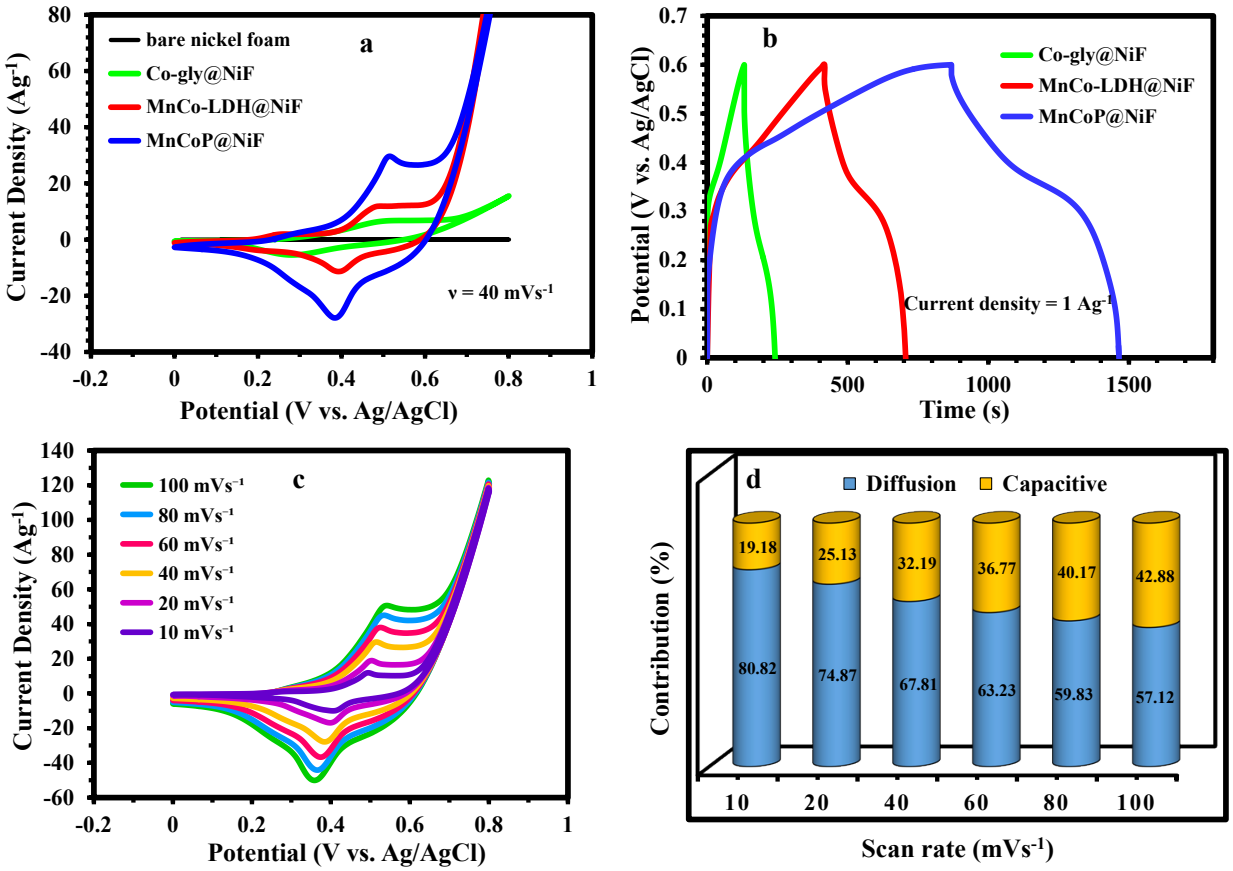

Fig. S5 (a) CVs of the bare nickel foam, Co-gly@NiF, MnCo-LDH@NiF, and MnCoP@NiF electrodes at 40 mVs^{-1} (b) Charge-discharge curves of the Co-gly@NiF, MnCo-LDH@NiF, and MnCoP@NiF electrodes at 1 Ag^{-1} (c) CVs of the MnCoP@NiF electrode from 10 to 100 mVs^{-1} (d) The relative contribution of the capacitive and diffusion-controlled charge storage in the prepared MnCoP@NiF electrode at different scan rates

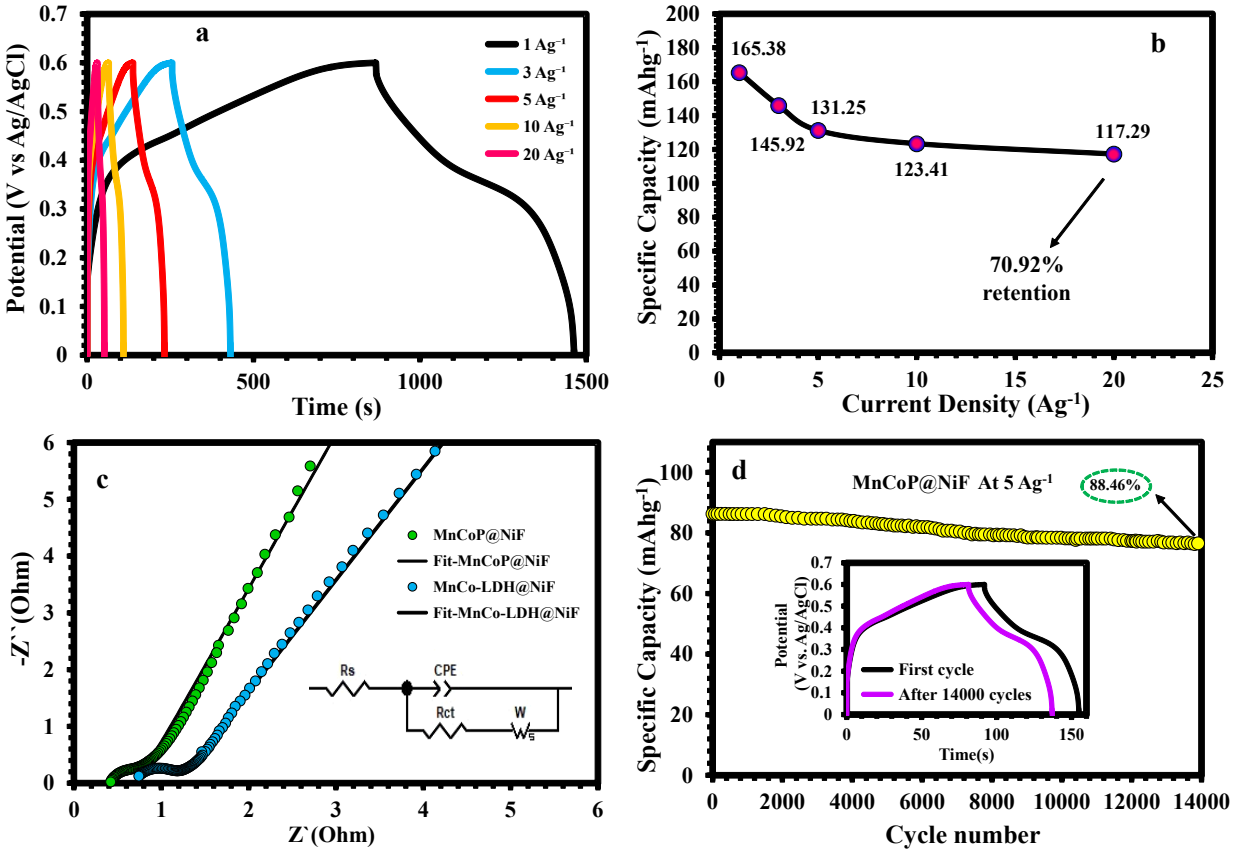

Fig. S6 (a) GCD profiles of the MnCoP@NiF electrode at different current densities (b) Rate performance of the MnCoP@NiF electrode (c) Nyquist plots of the MnCoP@NiF and MnCo-LDH@NiF electrodes (in the frequency range of 100 kHz to 1 Hz; equivalent circuit in inset) (d) Durability of the MnCoP@NiF electrode at 5 Ag^{-1}.

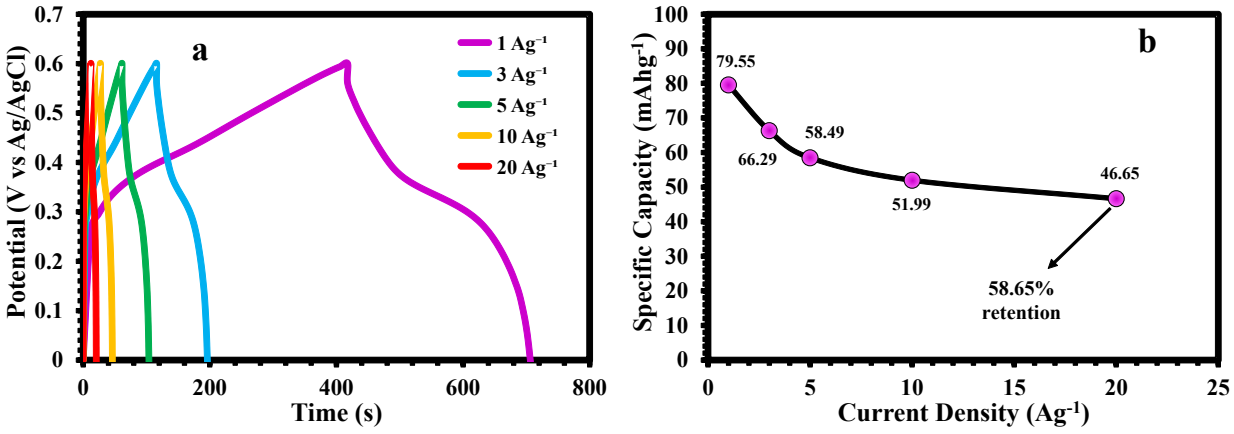

Fig. S7 (a) GCD profiles of the MnCo-LDH@NiF electrode at different current densities (b) Rate performance of the MnCo-LDH@NiF electrode.

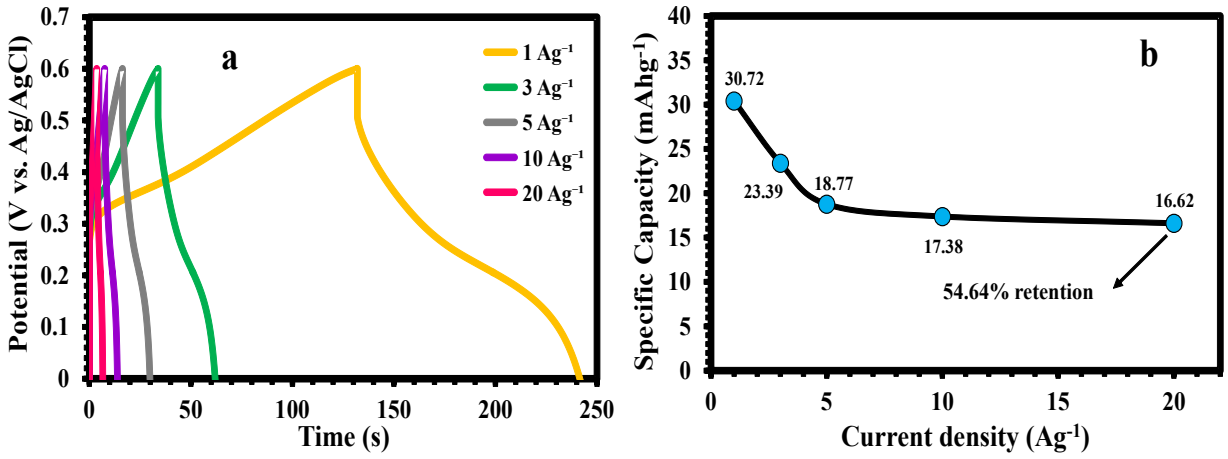

Fig. S8 (a) GCD profiles of the Co-gly@NiF electrode at different current densities (b) Rate performance of the Co-gly@NiF electrode.

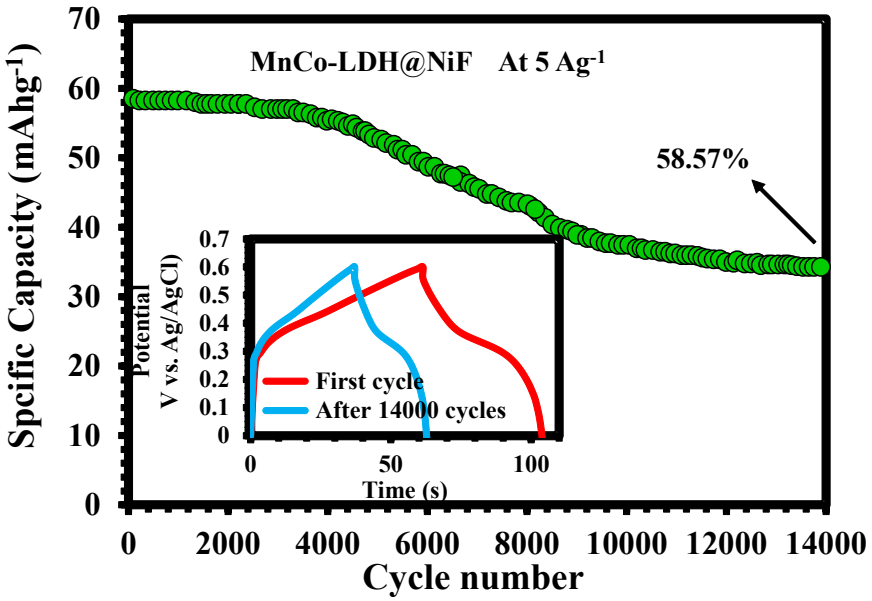

Fig. S9 Durability of the MnCo-LDH@NiF electrode at 5 Ag^{-1}.

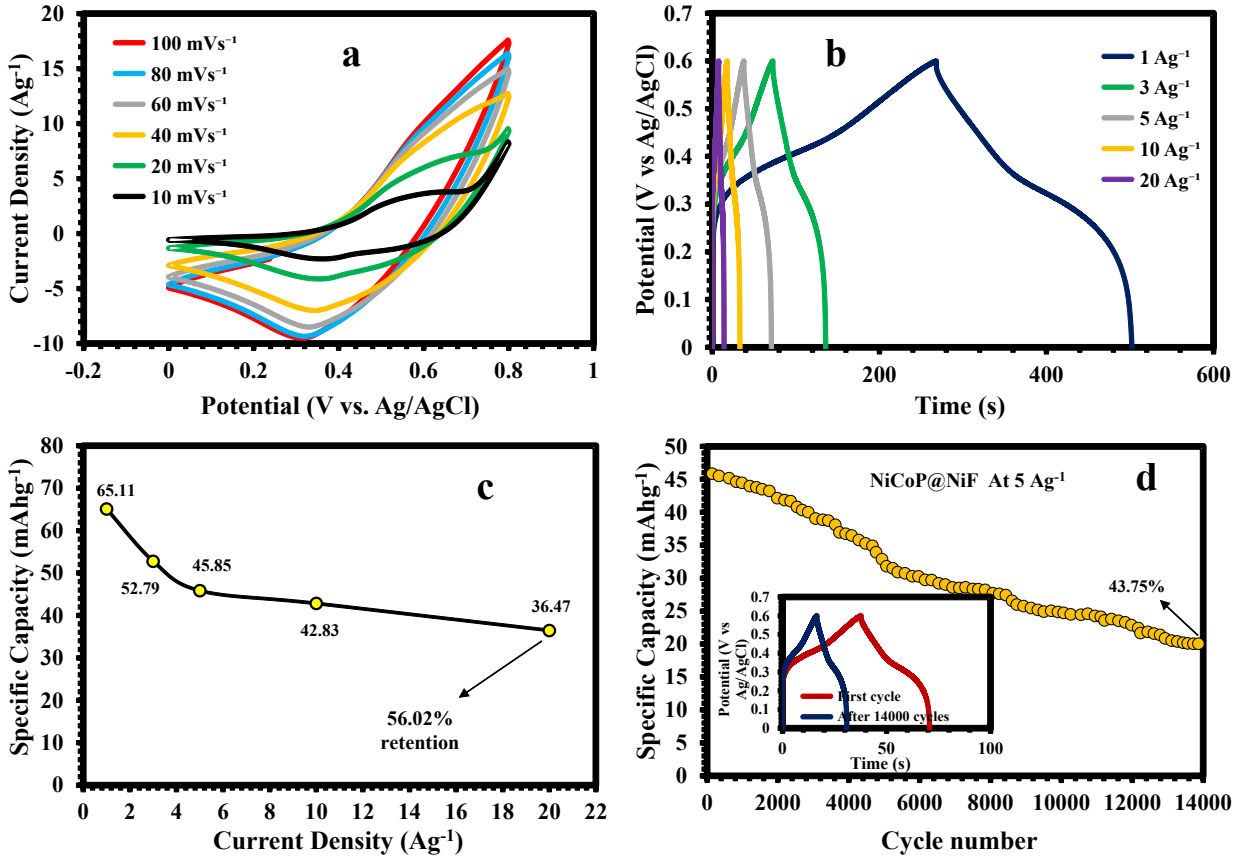

Fig. S10 (a) CVs of the NiCoP@NiF electrode at various scan rate of 10-100 mVs^{-1} (b) GCD curves of the NiCoP@NiF electrode at various current densities of 1-20 Ag^{-1} (c) Specific capacity vs. current density of the NiCoP@NiF electrode. (d) Durability of the NiCoP@NiF electrode at 5 Ag^{-1}.

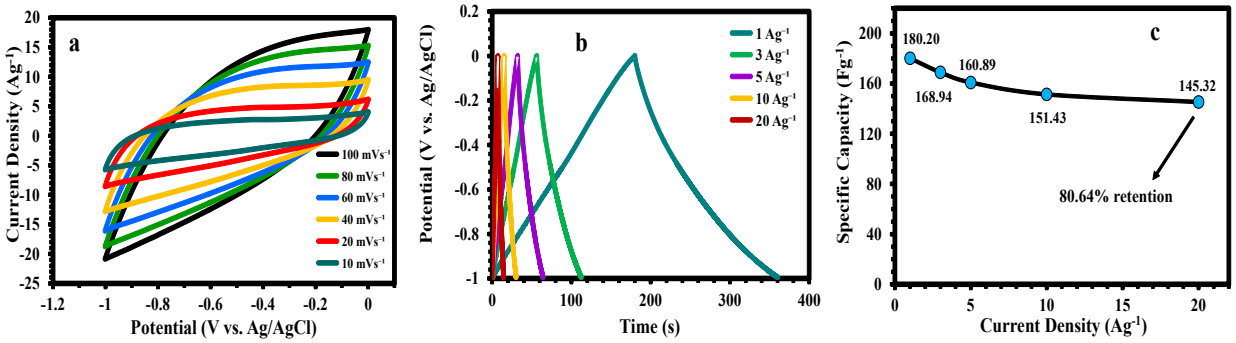

Fig. S11 (a) CVs of the AC-based electrode at various scan rate of 10-100 mVs^{-1} (b) GCD curves of the AC-based electrode at various current densities of 1-20 Ag^{-1} (c) Specific capacitance vs. current density of AC-based electrode.

Table S1 Comparison of the performance of the MnNiCoP electrode material with other previously reported materials

Composition	Capacity($mAhg^{-1}$)	Cycles, retention	Rate capability	ED(Wkg^{-1})	Reference
Ni_2P/NiCoP	205.92	3000, 89.2%	75.5% at 20 Ag^{-1}	44.5	1
O-CoxNiyP	199.19	5000, 95.1%	66.7% at 20 Ag^{-1}	47.5	2
Cu-Co-P	110.6	10000, 89%	83.1% at 10 Ag^{-1}	41.3	3
NiCoP/NC	172.18	8000, 75.5%	77.4% at 16 Ag^{-1}	52.5	4
NiCoP	182.91	5000, 80.7%	66% at 30 Ag^{-1}	41.3	5
$Ni_{0.4}Mn_{1.6}P$	176.66	2000, 75%	-	21.1	6
Ni-Co-P-3	213.1	5000, 85%	86% at 20 Ag^{-1}	48.4	7
MnNiCoP	291.24	14000, 91.30%	80% at 20 Ag^{-1}	57.03	This work

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