High-Performance, Flexible, All-Solid-State Wire-Shaped Asymmetric Micro-Supercapacitors Based on Three Dimensional $CoNi_2S_4$ Nanosheets Decorated －Nanoporous Ni－Zn－P Film/Cu Wire

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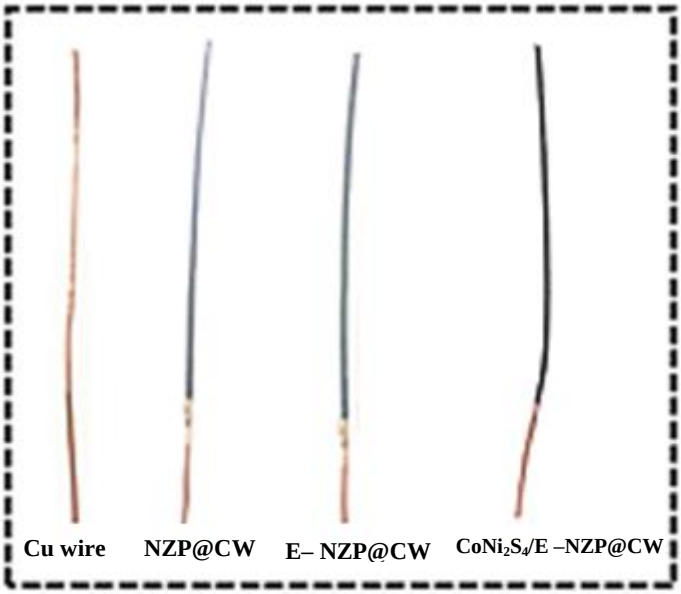

Fig.S1. Digital camera image of the Cu wire, NZP film, E– NZP@CW and $CoNi_2S_4$/E– NZP@CW.

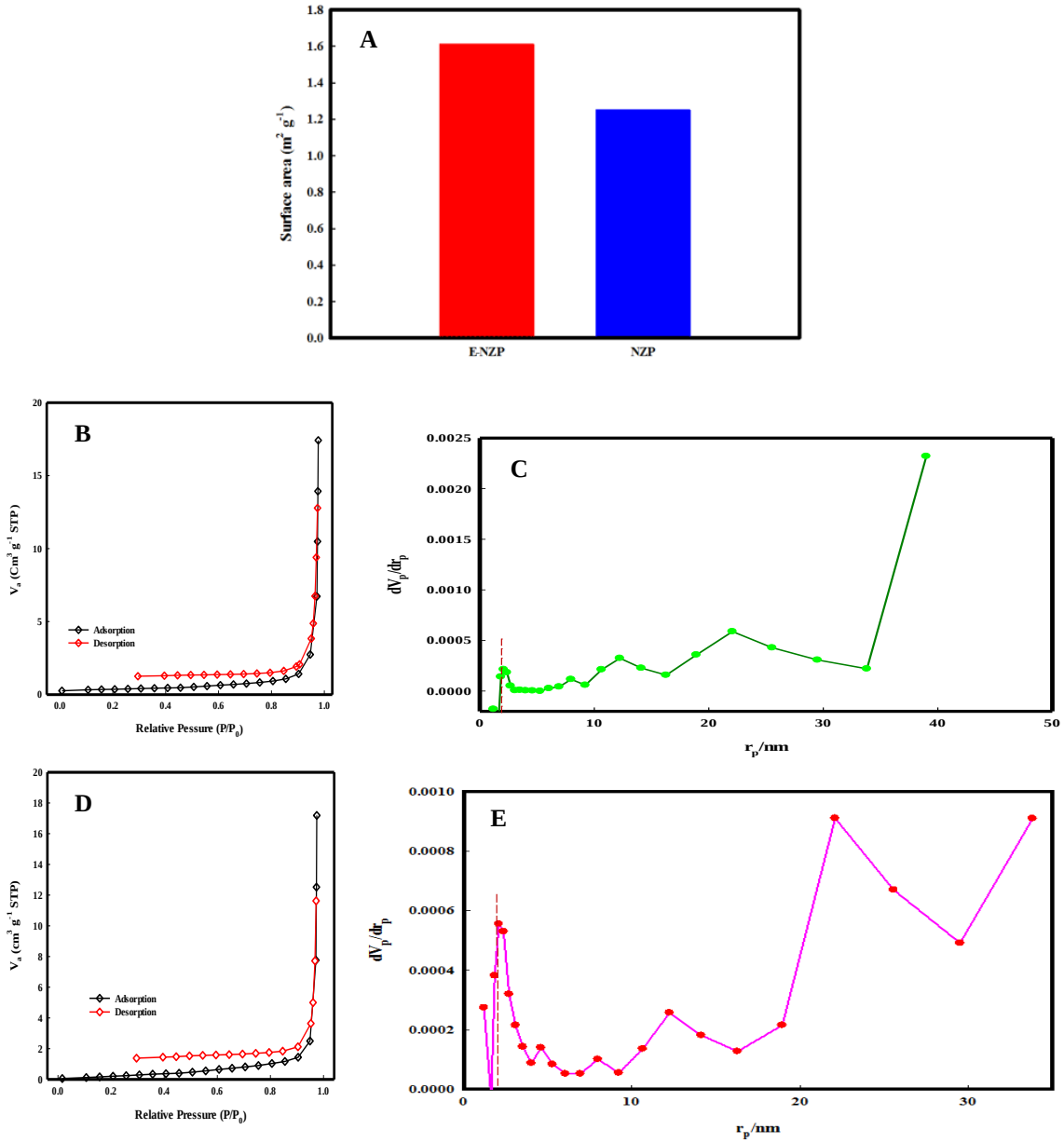

Fig. S2. (A) Comparison of surface area between NZP@CW and E– NZP@CW electrodes by BET analysis. The N_2 adsorption-desorption isotherm (B) NZP@CW (D) E–NZP@CW and the pore size distribution of (C) NZP@CW and (E) E–NZP@CW .

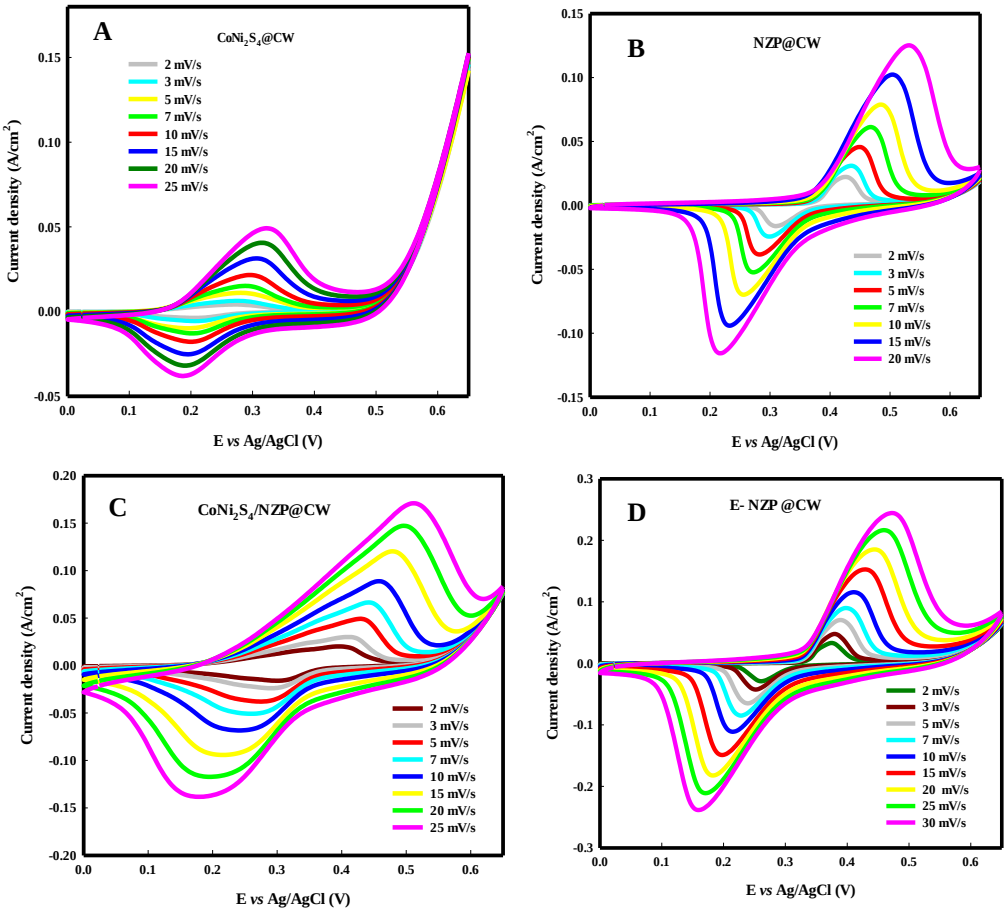

Fig. S3. Typical CV curves of (A) $CoNi_2S_4$, (B) NZP, (C) $CoNi_2S_4$/ NZP, (D) E– NZP electrode at different scan rates.

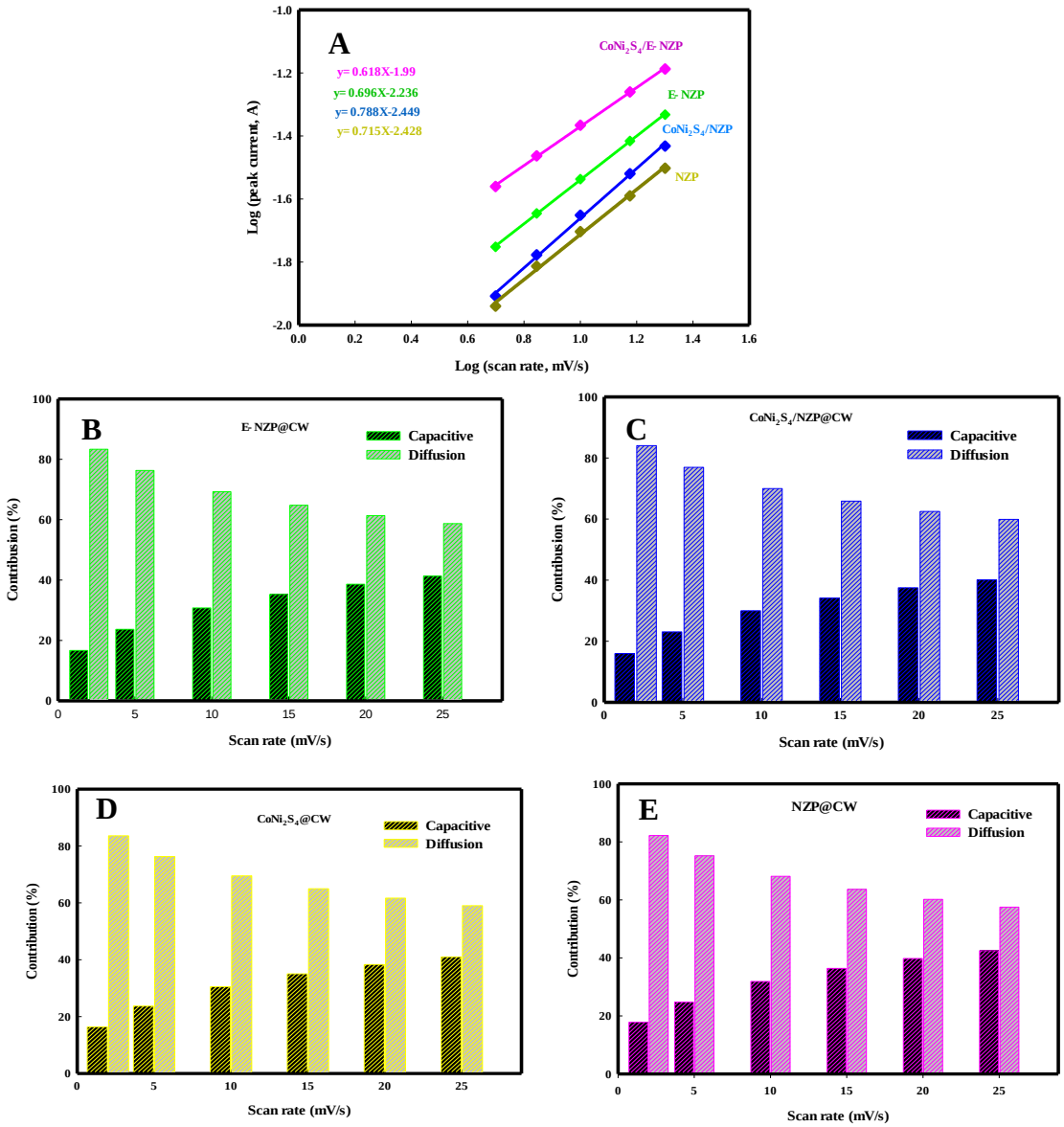

Fig. S4. (A) Logarithm relationship between anodic peak current and scan rate. (B–E) Comparison of charge storage for prepared electrodes at different scan rates.

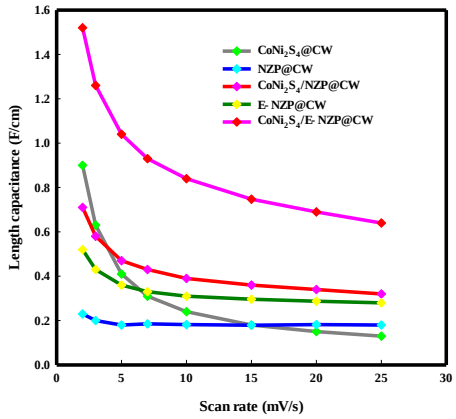

Fig. S5. Length capacitance of NZP, E–NZP and $CoNi_2S_4$/ NZP, $CoNi_2S_4$ and $CoNi_2S_4$/E– NZP electrodes as function of scan rate.

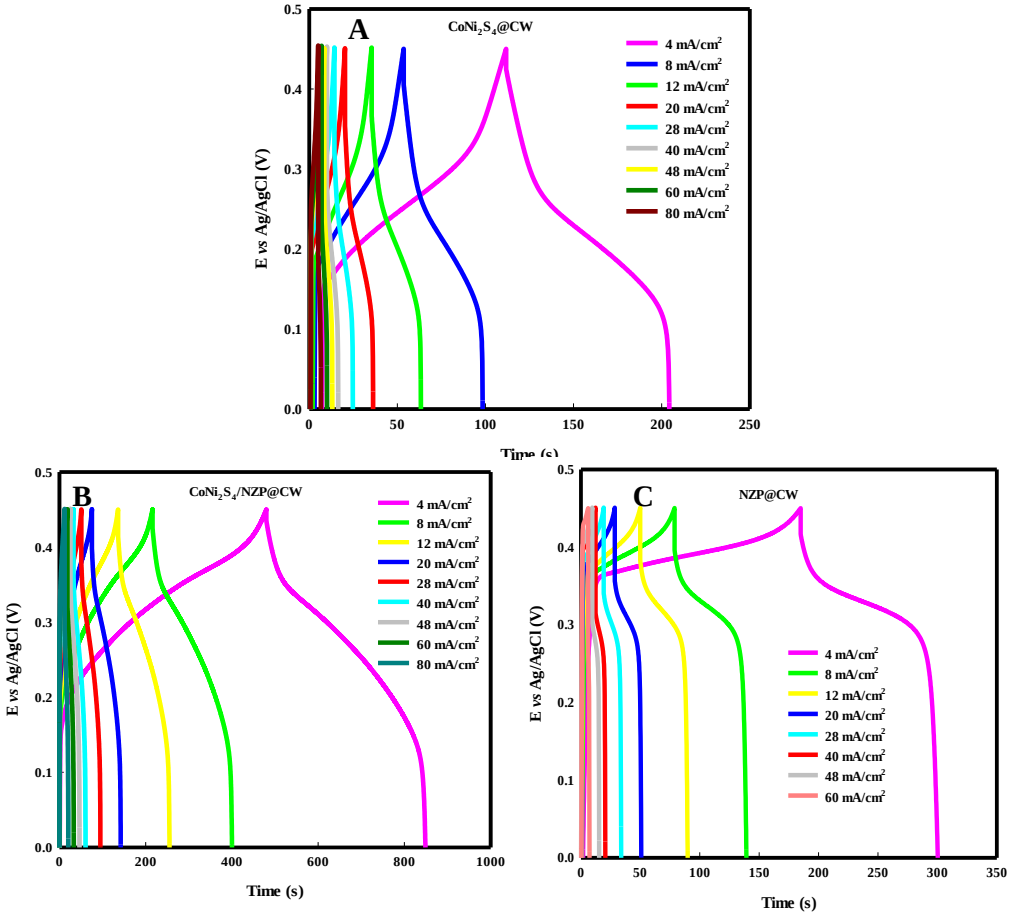

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Fig. S6. Typical GCD curves of (A) $CoNi_2S_4$, (B) $CoNi_2S_4$/ NZP, (C) NZP electrode at different current densities,

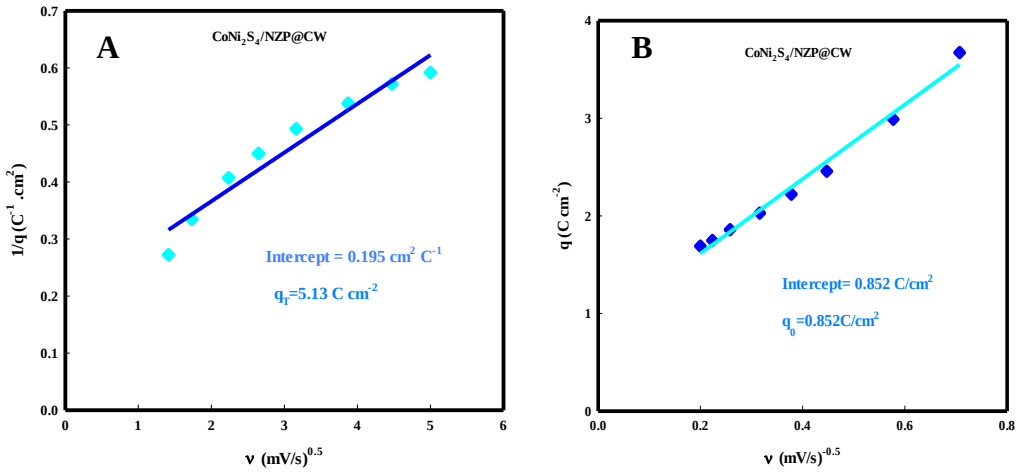

Fig. S7. Trasatti plots of (A) 1/q (*v*) against $v^{0.5}$, (B) q (*v*) against $v^{-0.5}$ of $CoNi_2S_4$/ NZP electrode.

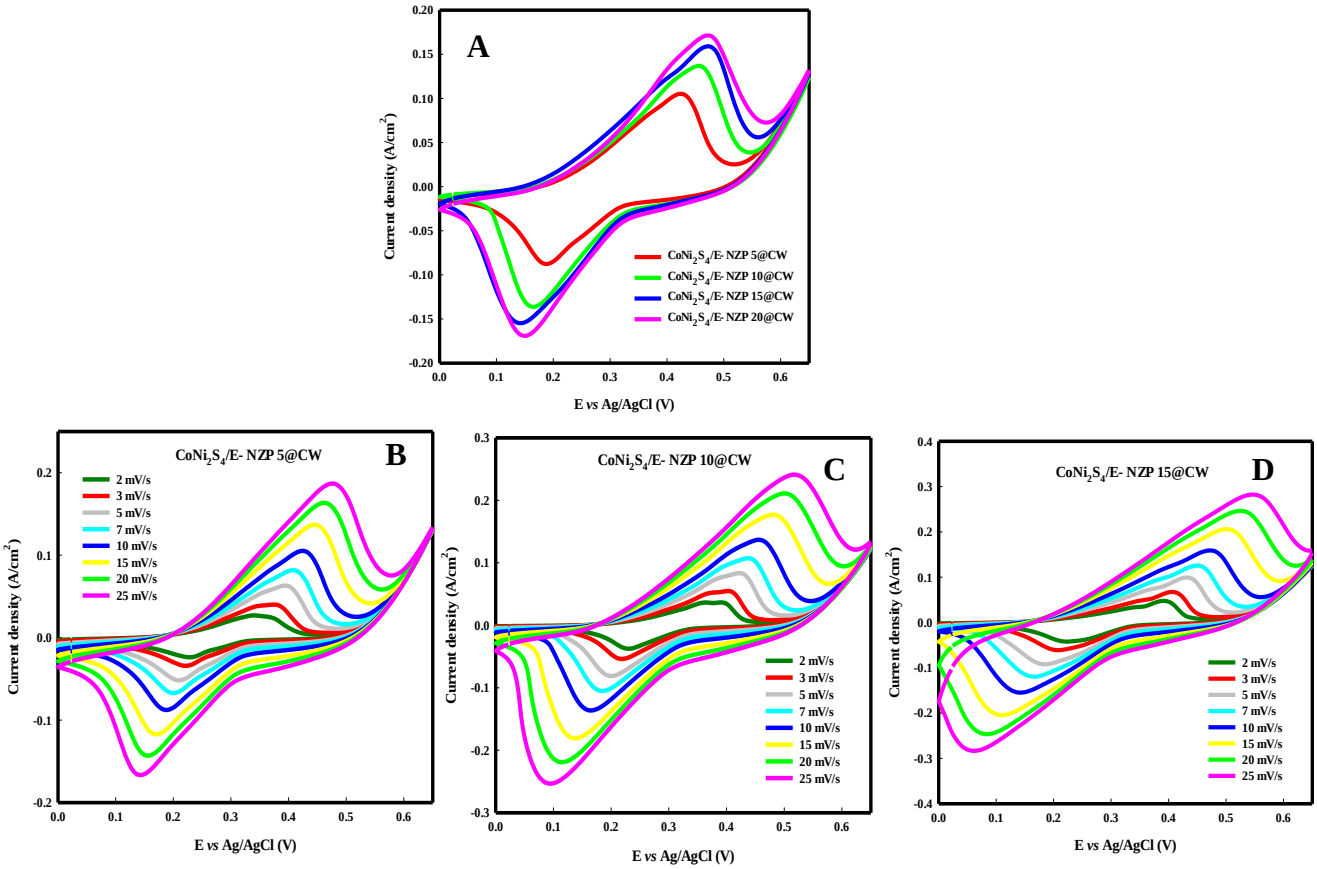

Fig. S8. (A) CV curves of $CoNi_2S_4$/E–NZP electrode at different deposition times of NZP film. CV curves of $CoNi_2S_4$/E–NZP electrode at different scan rates for (B) 5 min, (C) 10 min, (D) 15 min.

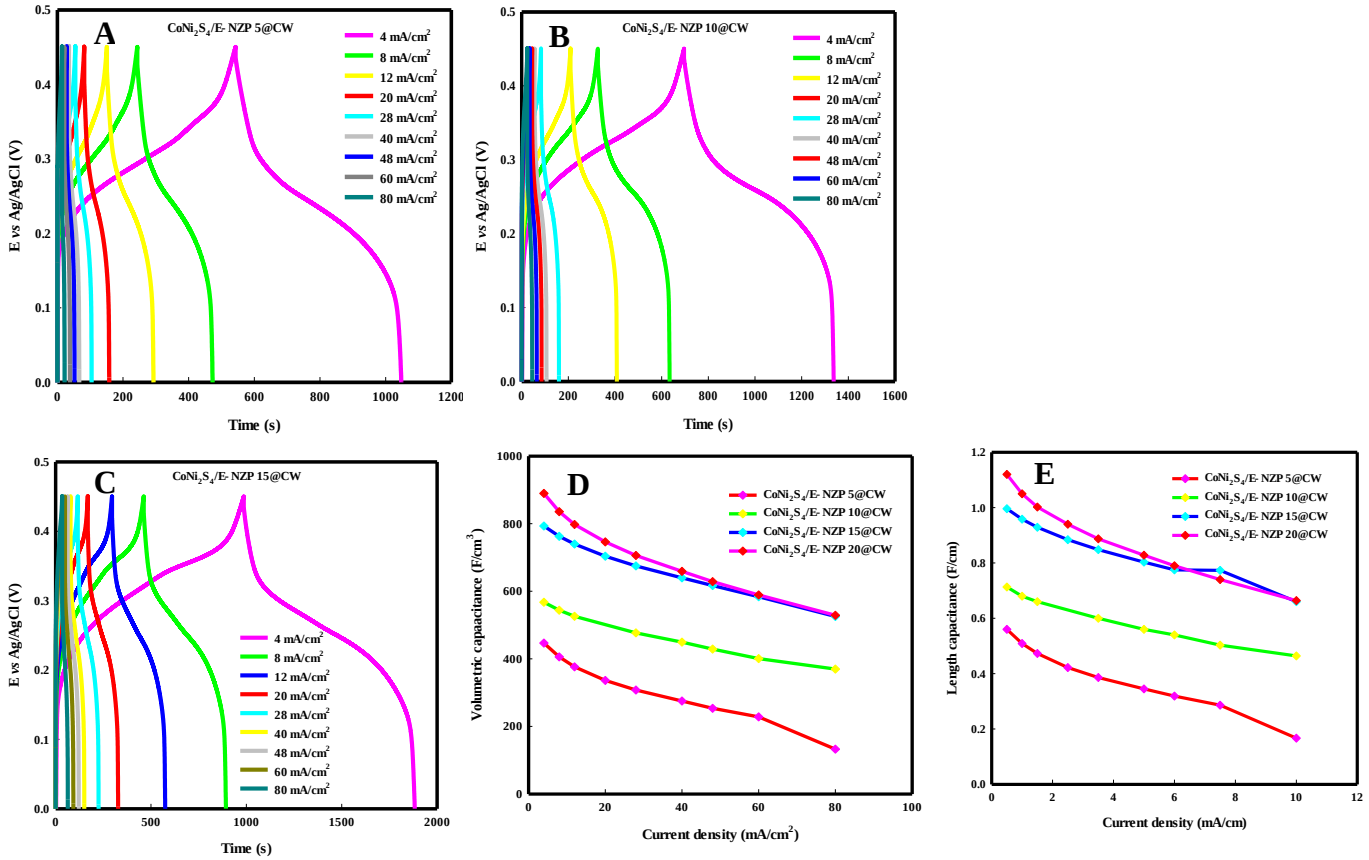

Fig. S9. GCD curves of $CoNi_2S_4$/E–NZP electrode at different Current densities for (A) 5 min, (B) 10 min, (C) 15 min. Their corresponding volumetric (D) length (E) capacitances as a function of current density.

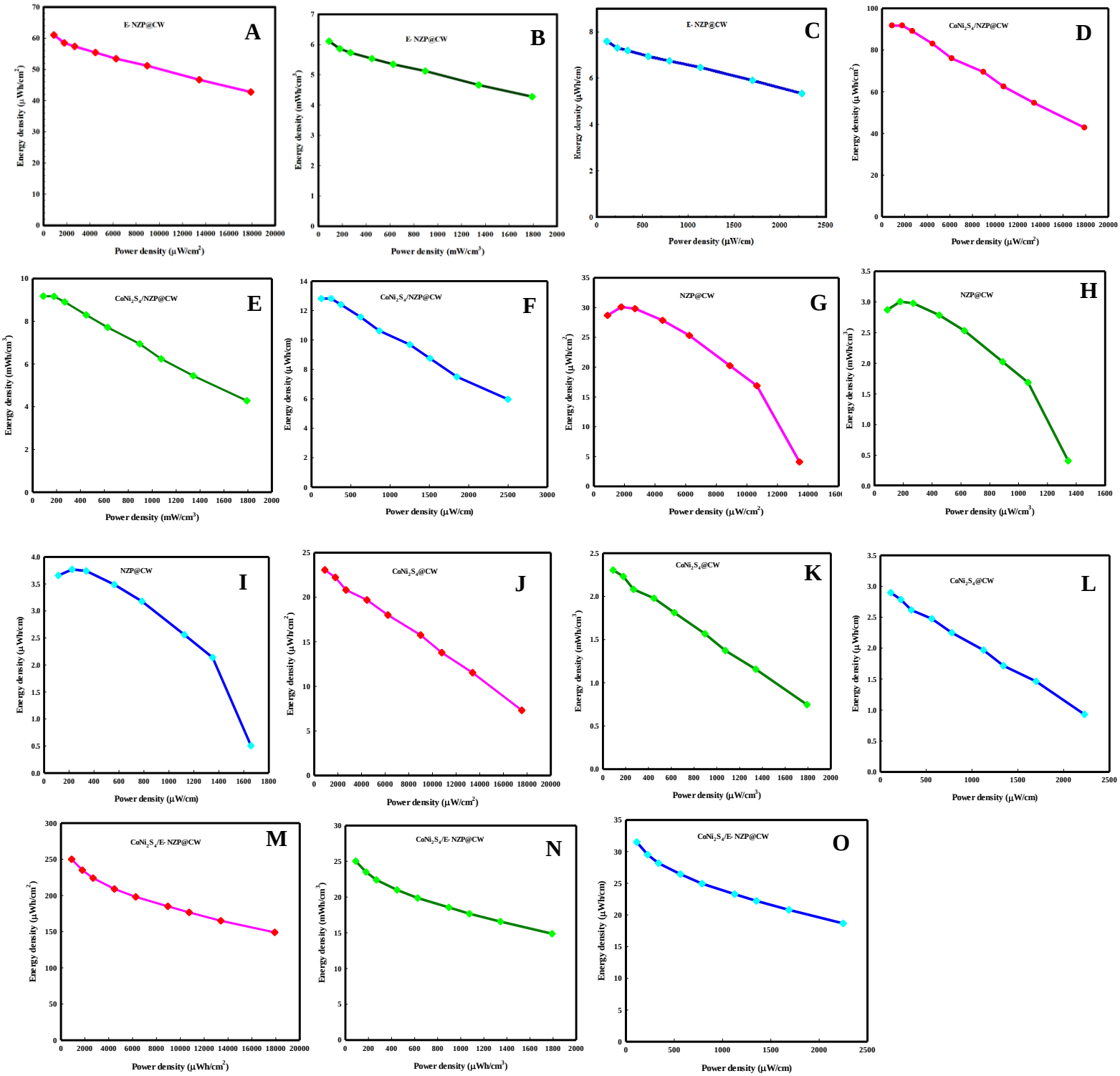

Fig. S10. Areal, Volumetric, Length Ragone plot NZP, E–NZP and $CoNi_2S_4$/ NZP, $CoNi_2S_4$ and $CoNi_2S_4$/E– NZP electrodes

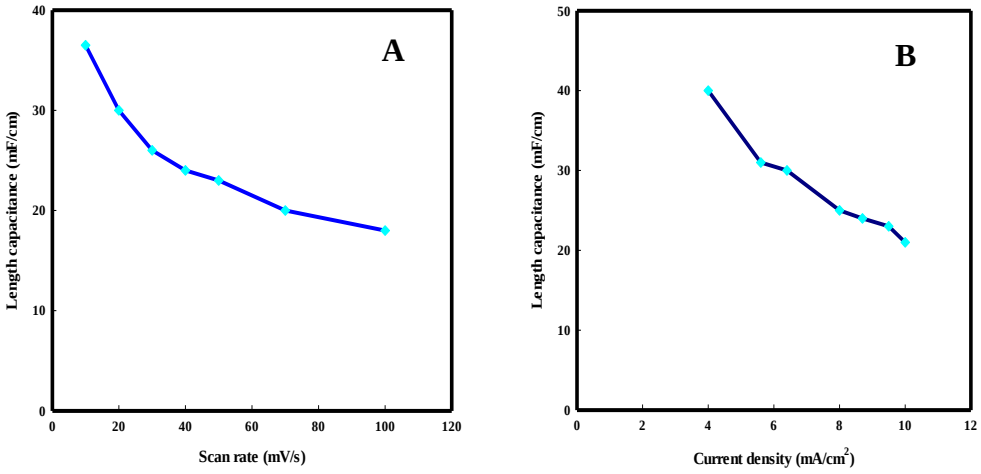

Fig.S11. Length capacitance of solid– state ASC device as a function of (A) scan rate, (B) current density.

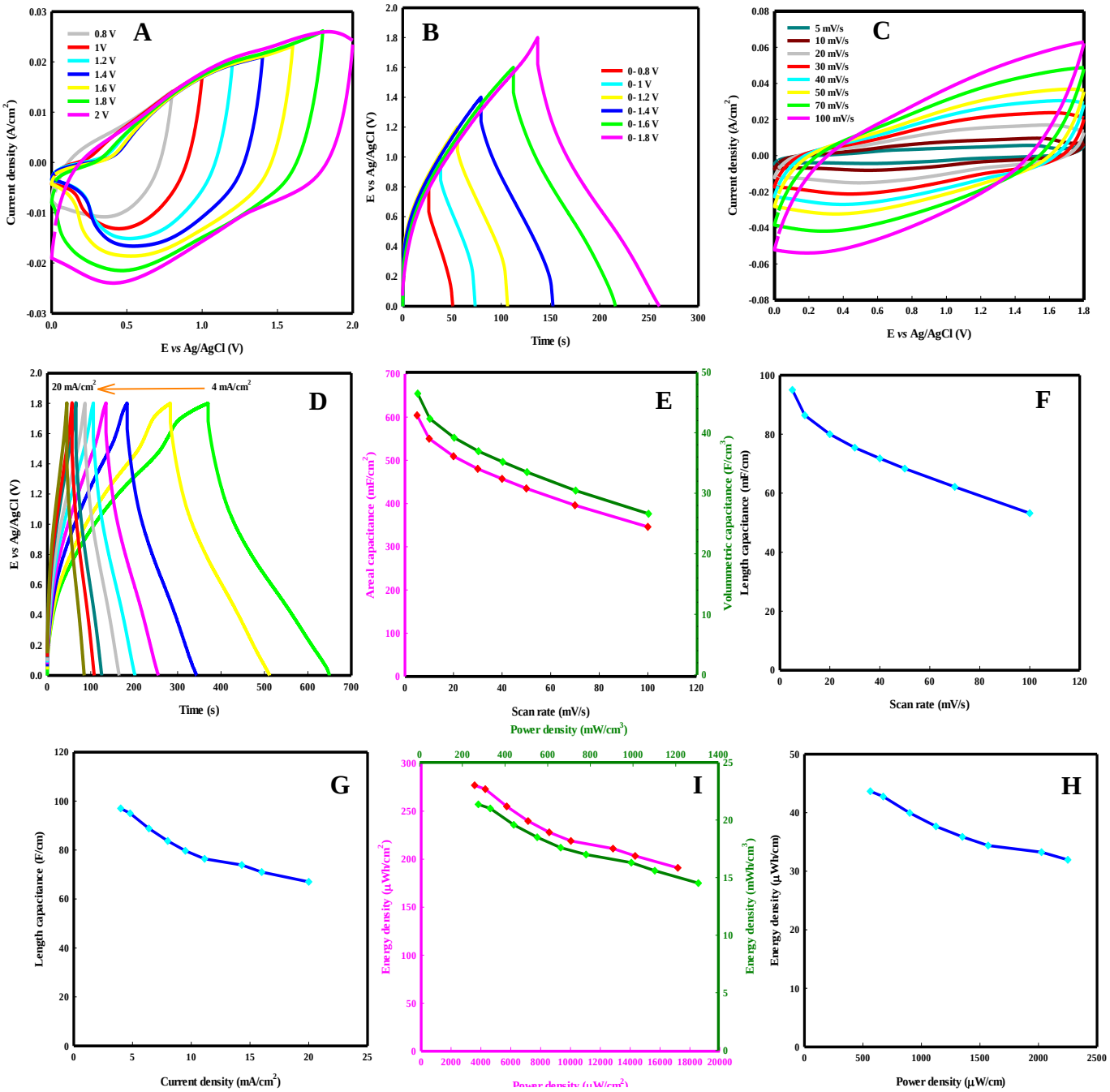

Fig. S12. (A) CV, (B) GCD curves of $CoNi_2S_4$/E–NZP@CW//rGO/CF at different potential ranges at 30 mV s^{-1} and 8 mA cm^{-2}at aqueous electrolyte (B) CV curves of the ACS device at different scan rates at aqueous electrolyte. (D) GCD curves of the ASC device at different current densities at aqueous electrolyte. (E) Areal and volumetric capacitance of ASC device at different scan rates at aqueous electrolyte. (F) Length capacitance of ASC device at different scan rates at aqueous electrolyte. (G) Length capacitance of ASC device at different current densities. (I) Areal and volumetric, (H) Length Ragon plot of ASC device at aqueous electrolyte.

Table S1. Electrochemical performances of recent reported fiber supercapacitors

Electrode material	Capacitance			Energy density			Power density			Ref
	C_L mF cm^{-1}	C_A mF cm^{-2}	C_V F cm^{-3}	E_L µWh cm^{-1}	E_A µWh cm^{-2}	E_V mWh cm^{-3}	P_L µW cm^{-1}	P_A µW cm^{-2}	P_V mW cm^{-3}	
$CoNi_2S_4$/E–NZP //rGO (solid state)	40	241	18.54	18	108.4	8.34	1454	9280	716.9	**This work**
$CoNi_2S_4$/E–NZP //rGO (aqueous electrolyte)	97	617	47.46	43.65	277	21.36	. 2713.5	17190	1306	**This work**
Symmetric Cu@Ni/porous Ni/ $MnCo_2O_4$	20.6	54.8	–	12.8	4.8	–	292.5	1040	–	[17]
Symmetric $NiCo_2O_4$/ Ni fiber	–	–	–	–	–	0.21	–	–	15.5	[18]
$NiCo_2S_4$ //N-rGO	9.6	120	19.57	2.613	32.67	5.33	420.1	5352.92	855.69	[19]
$Ni(OH)_2$/Ni–Cu/ CW // RGO/ CF	86	550	42.3	30.7	195	15.04	1200	7643	588	[20]
3D–$NiMoO_4$/Ni//rGO	79.2	504	38.8	31.79	202	15.6	2124	13530	1040.73	[21]
MnO_2/MGr/Ni	6.9	73.2	9.8	0.62	–	0.88	75	–	25	[51]
NPG@MnO_2// CNT/Carbon paper	–	12	–	–	5.4	–	–	2531	–	[53]
Ni/$Ni(OH)_2$ //Ni/OMC	6.67	35.67	–	–	10	2.16		7300	1600	[59]
Ni/NiO/$Ni(OH)_2$/ PEDOT//Ni/CMK-3	–	31.6	3.16	–	11	–		7800	–	[60]
MnO_2/RGO/CF// GH/CW	–	50.8	2.54	–	18.1	0.9	–	–	200	[52]
$Ni(OH)_2$ RGO/Ni //RGO/Ni	–	–	2.32	–	–	0.83	–	–	3430	[62]
CF@RGO@MnO_2 // CF@TRGO	–	178.3	–	–	18.5	1.23	–	400	270	[63]
NiCo- DHs /CNT//Pen ink/CNT	–	–	–	–	9.57	–	–	492.17	–	[64]
Symmetric pErGO@Cuf/Cu wire	40.5	283.5	–	5.6	39.3	–	2.5	17.6	–	[65]
Ni_3S_2/Ni wire// Pen ink electrode	87.25	–	–	–	–	0.81	–	–	285	[66]