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Supporting Information

Cu_2CoGeS_4 nanocrystals for high performance aqueous polysulfide/iodide redox flow batteries: enhanced selectively to the electrocatalytic conversion of polysulfides

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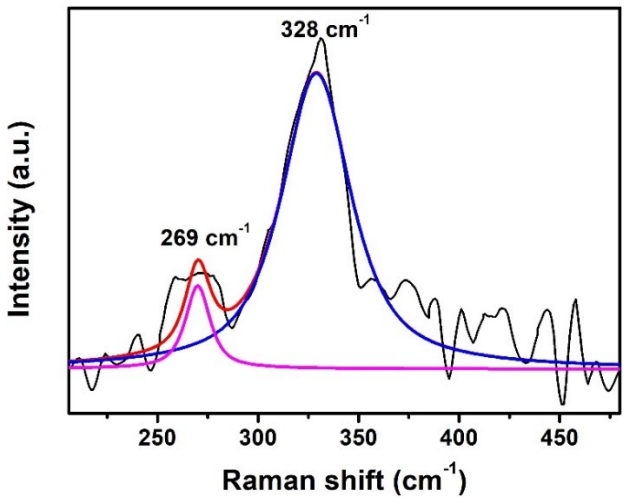

Figure S1. The Raman spectra of the as-synthesized Cu_2CoGeS_4 nanocrystals.

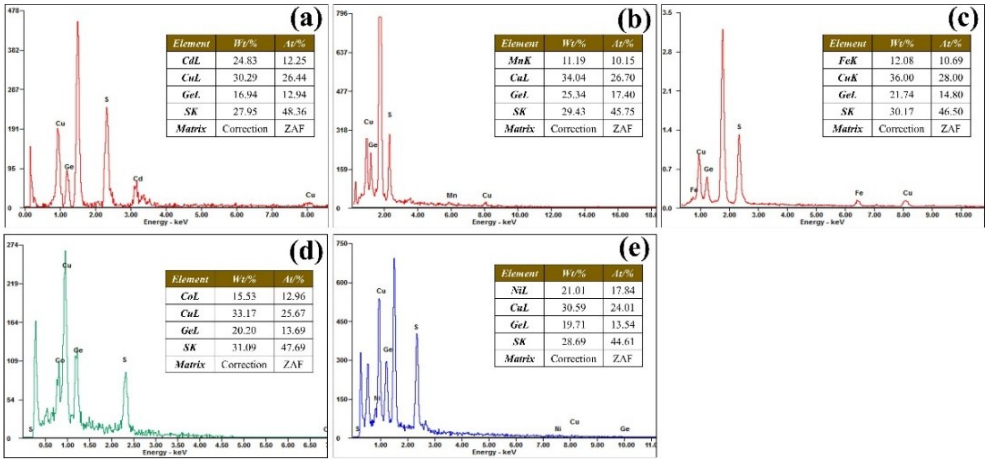

Figure S2. EDS spectrum of the as-prepared Cu_2XGeS_4 (X=Fe, Co, Ni, Cd, Mn) nanocrystals.

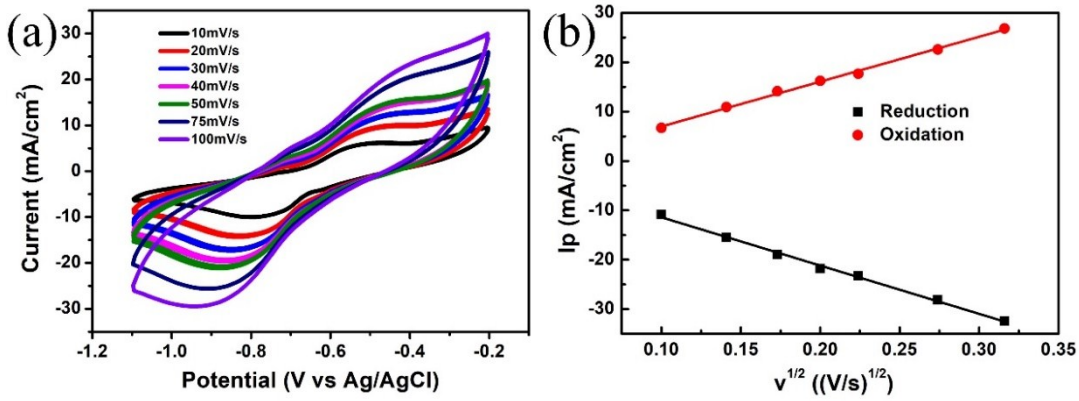

Figure S3. (a) The CVs of the negative electrolyte sweeping at different scan rates from 10 mV s^{-1} to 100 mV s^{-1}; (b) The linear relationship between the peak current density with the square root of the scan rates.

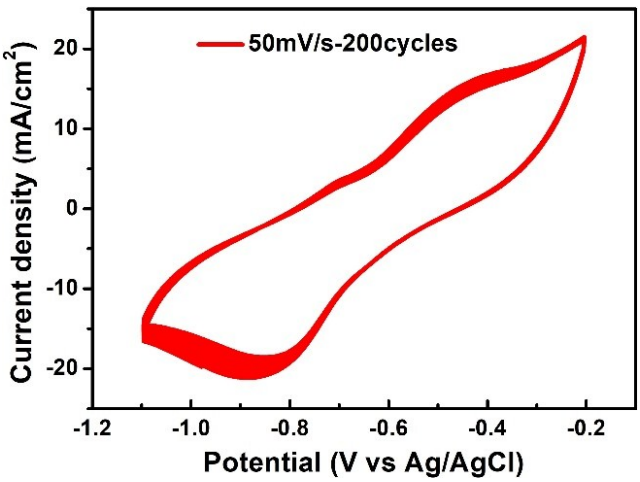

Figure S4. 200 consecutive cycles of the negative electrolyte with CP-Cu_2CoGeS_4 work electrode at a scan rate of 50 mV s^{-1}.

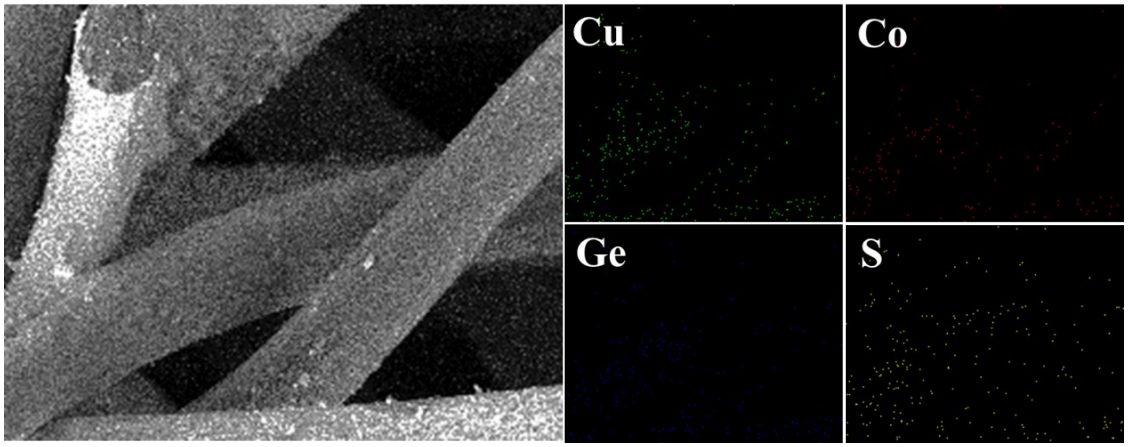

Figure S5. Elemental mappings spectrum of the as-prepared GF-Cu_2CoGeS_4 composite electrode.

Table S1 Summary of simulation results from EIS spectra of different electrodes.

Electrode	R_s (Ω cm^2)	R_{ct1} (Ω cm^2)	R_{ct2} (Ω cm^2)
GF	20.93	2.61	19.43
GF-Cu_2CoGeS_4	7.36	0.37	1.82
GF-Cu_2NiGeS_4	8.20	0.98	4.32
GF-Cu_2CdGeS_4	9.54	1.24	27.06
GF-Cu_2FeGeS_4	9.42	3.08	32.57
GF-Cu_2MnGeS_4	25.54	3.63	5.14

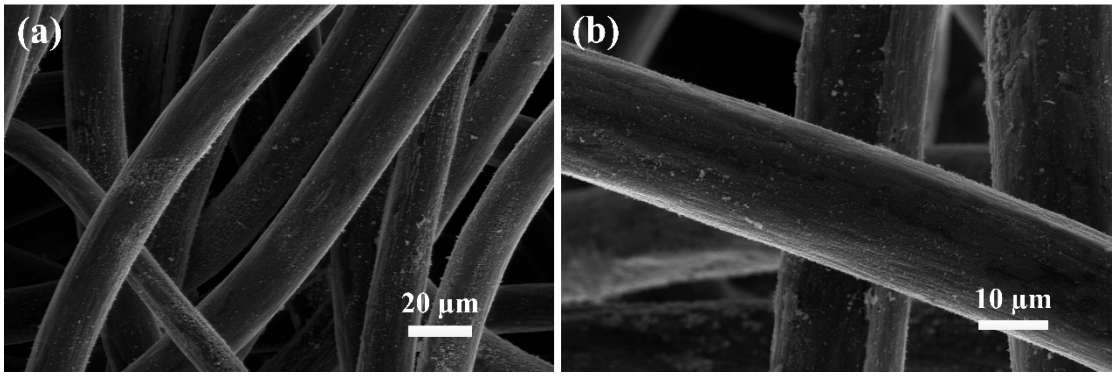

Figure S6. Scanning electron microscope (SEM) showing the morphologies of GF-Cu_2CoGeS_4 composite electrode after 50 cycles at 20 mA cm^{-2} with the 50% SOC; (a) at low magnification; (b) at high magnification.

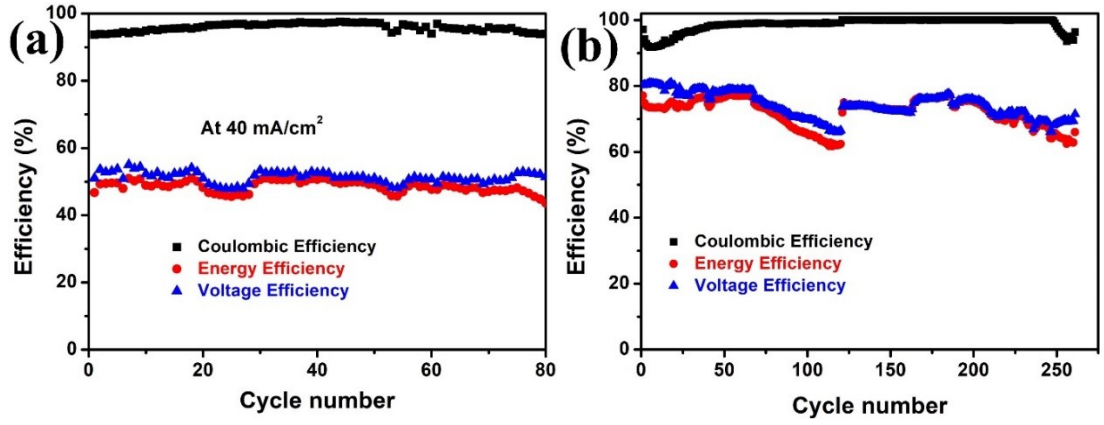

Figure S7. The cycling performance of the flow battery for the GF-Cu_2CoGeS_4 composite electrode; (a) at 40 mA cm^{-2} with the 50% SOC; (b) at 20 mA cm^{-2} with the 10% SOC.