

# **Carbon-coated ZnS-FeS<sub>2</sub> hetero-structure as anode material for Lithium-ion battery applications**

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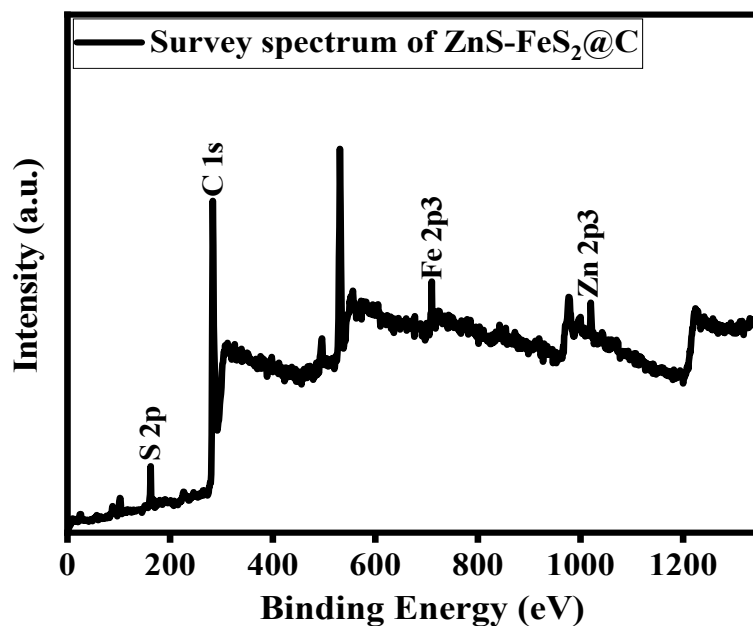


Figure S1. XPS survey spectrum of ZnS-FeS<sub>2</sub>@C.

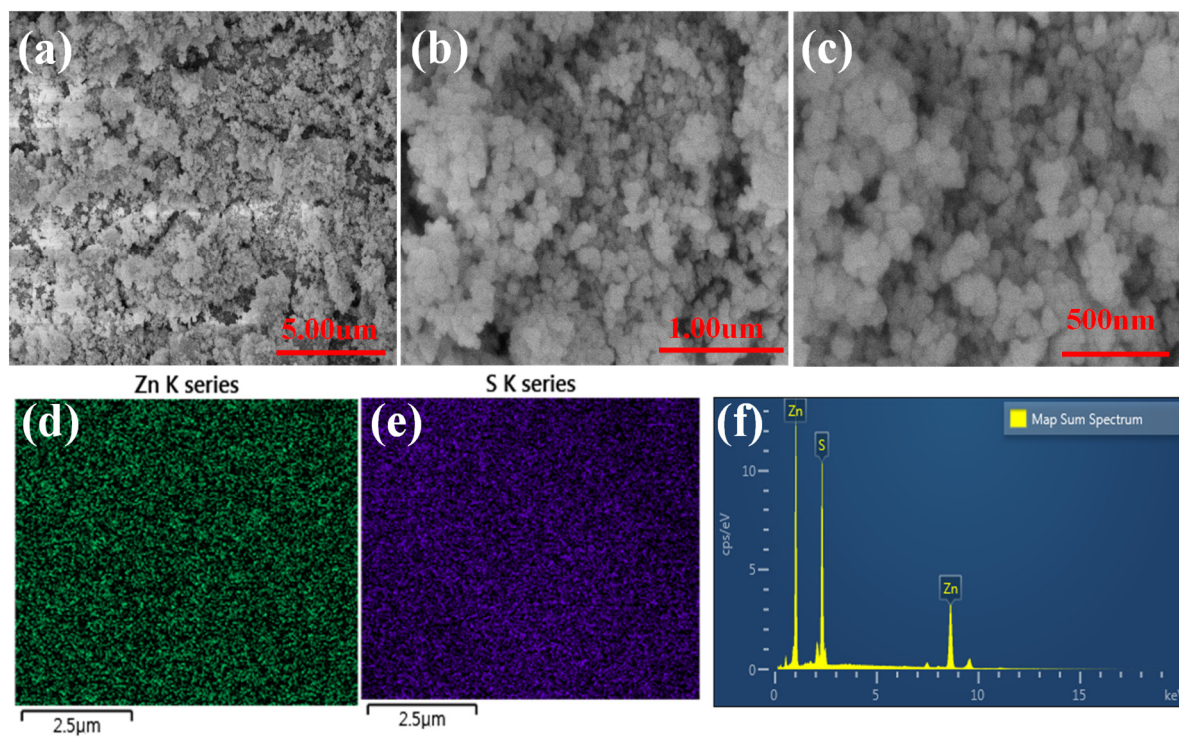
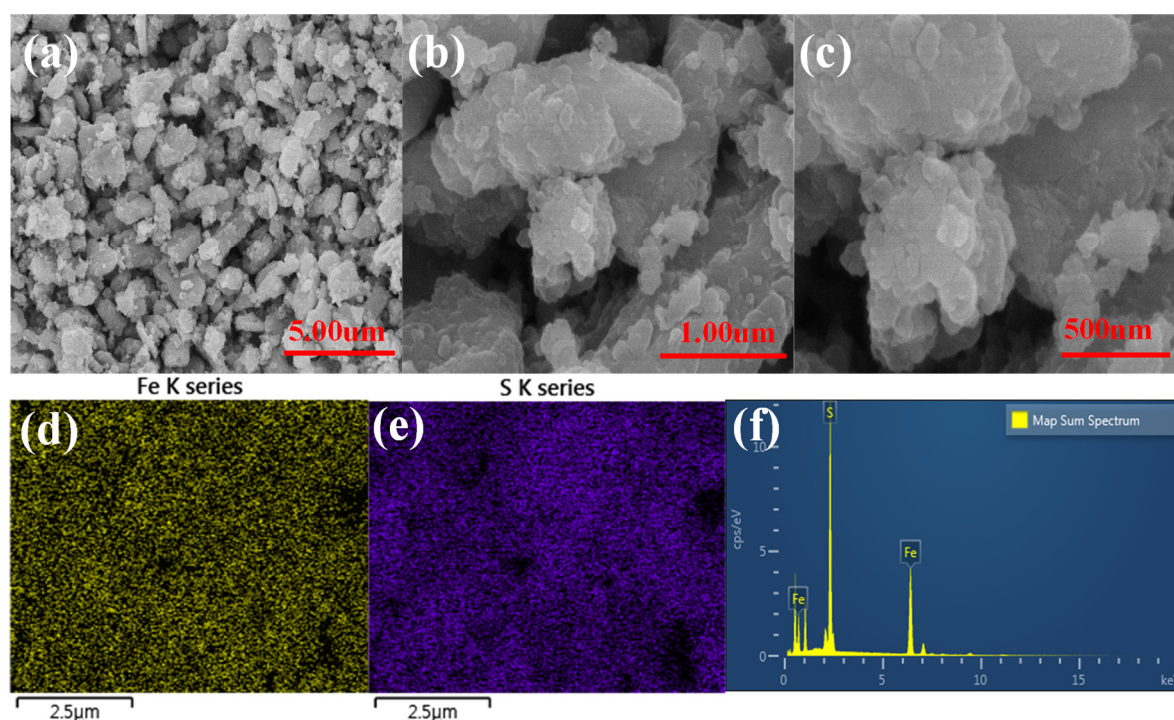
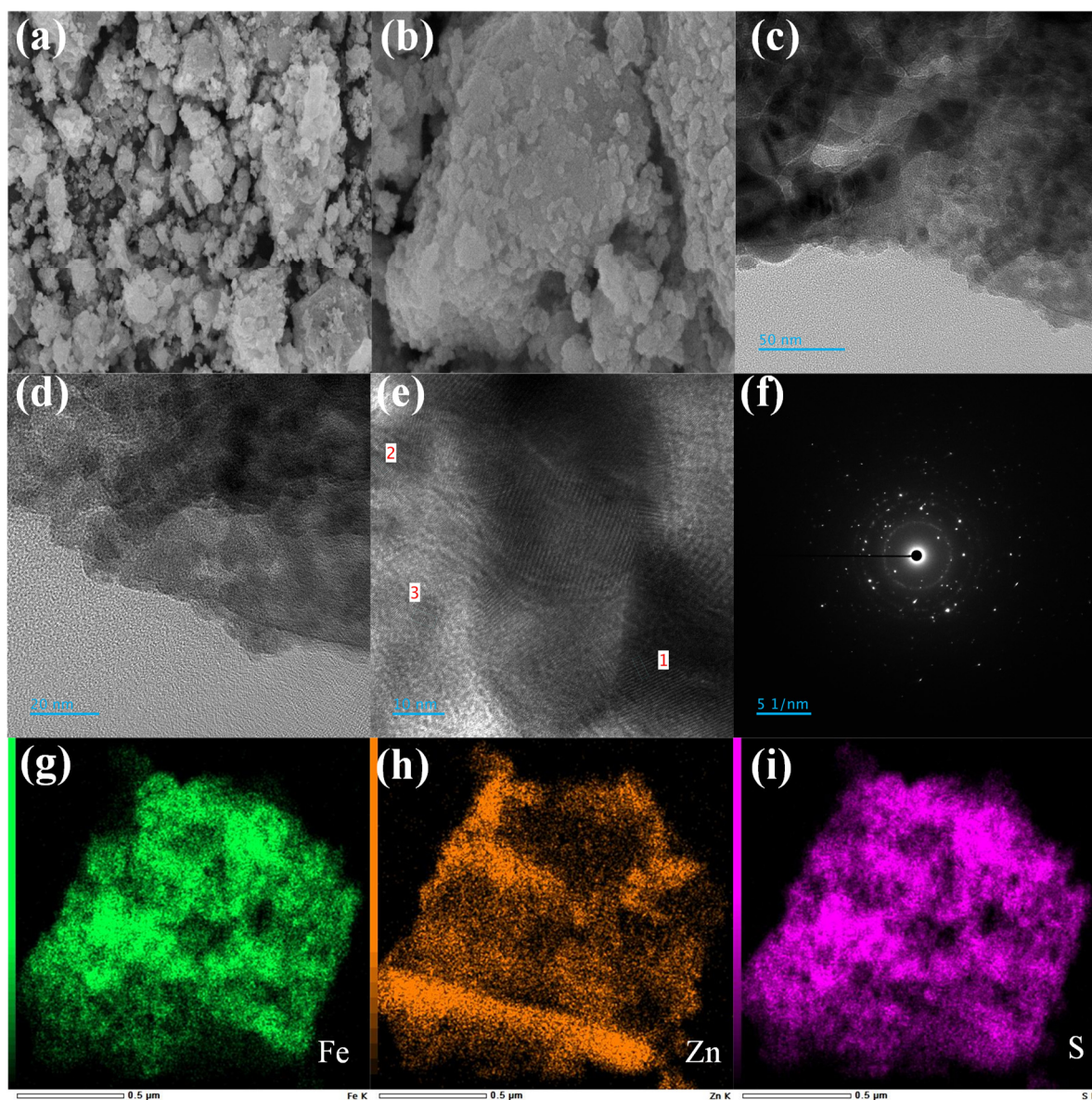


Figure S2. (a-c) FE-SEM images, (d-e) elemental mapping, and (f) elemental mapping spectrum of ZnS.

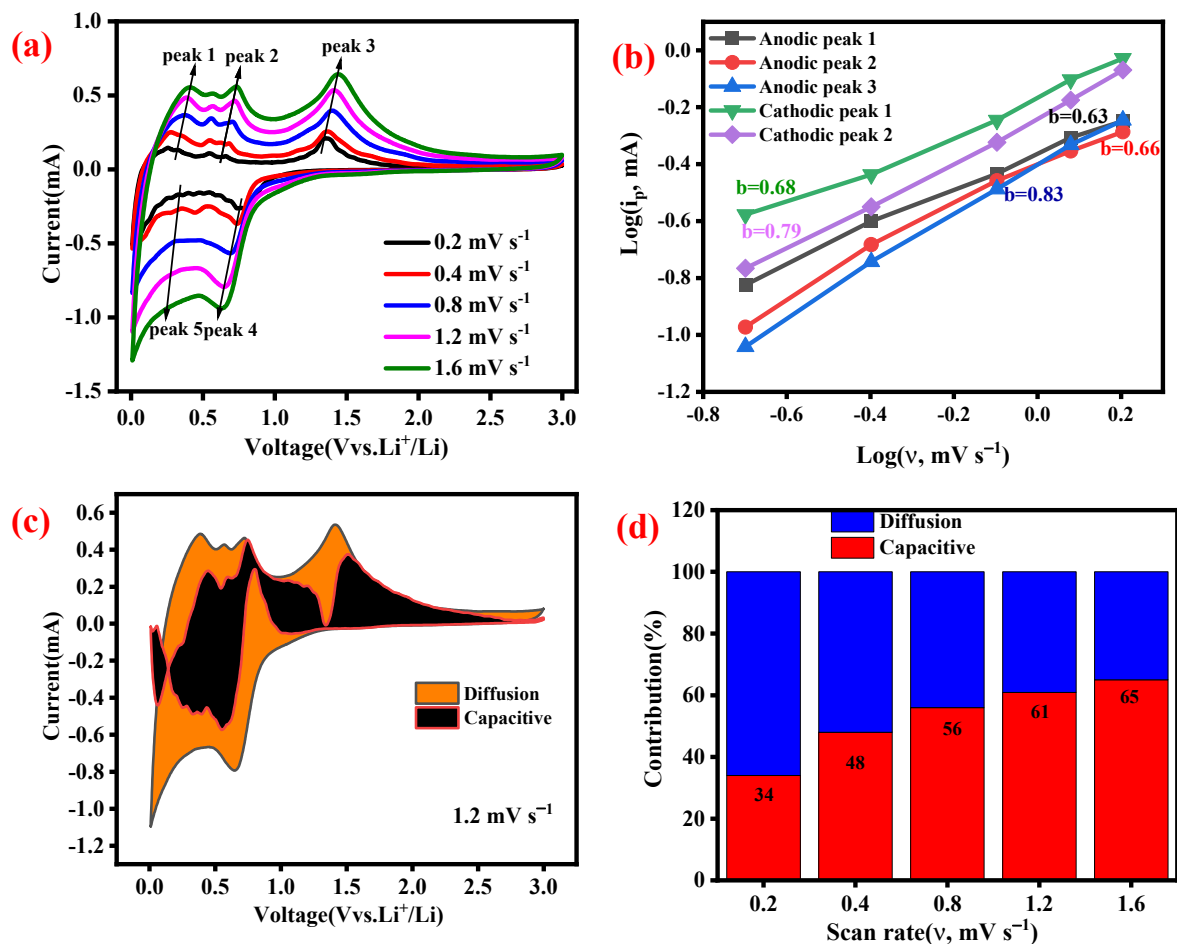


**Figure S3. (a-c) FE-SEM images, (d-e) elemental mapping, and (f) elemental mapping spectrum of  $\text{FeS}_2$ .**





**Figure S4. (a-b) FE-SEM images and HRTEM images with (c) Low magnification, (d-e) High magnification, (f) SAED pattern, and (g-j) EDS mapping images of heterostructured ZnS-FeS<sub>2</sub>.**



**Figure S5.** (a) CV curves of the ZnS electrode at different scan rates from 0.2 to 1.6  $\text{mV s}^{-1}$ , (b) Linear plot of log peak current versus log scan rate of ZnS, (c) Capacitive and diffusion contribution of ZnS electrode @ 1.2  $\text{mV s}^{-1}$ , (d) Percentage of capacitive and diffusion contribution ratio of ZnS electrode at different rates.

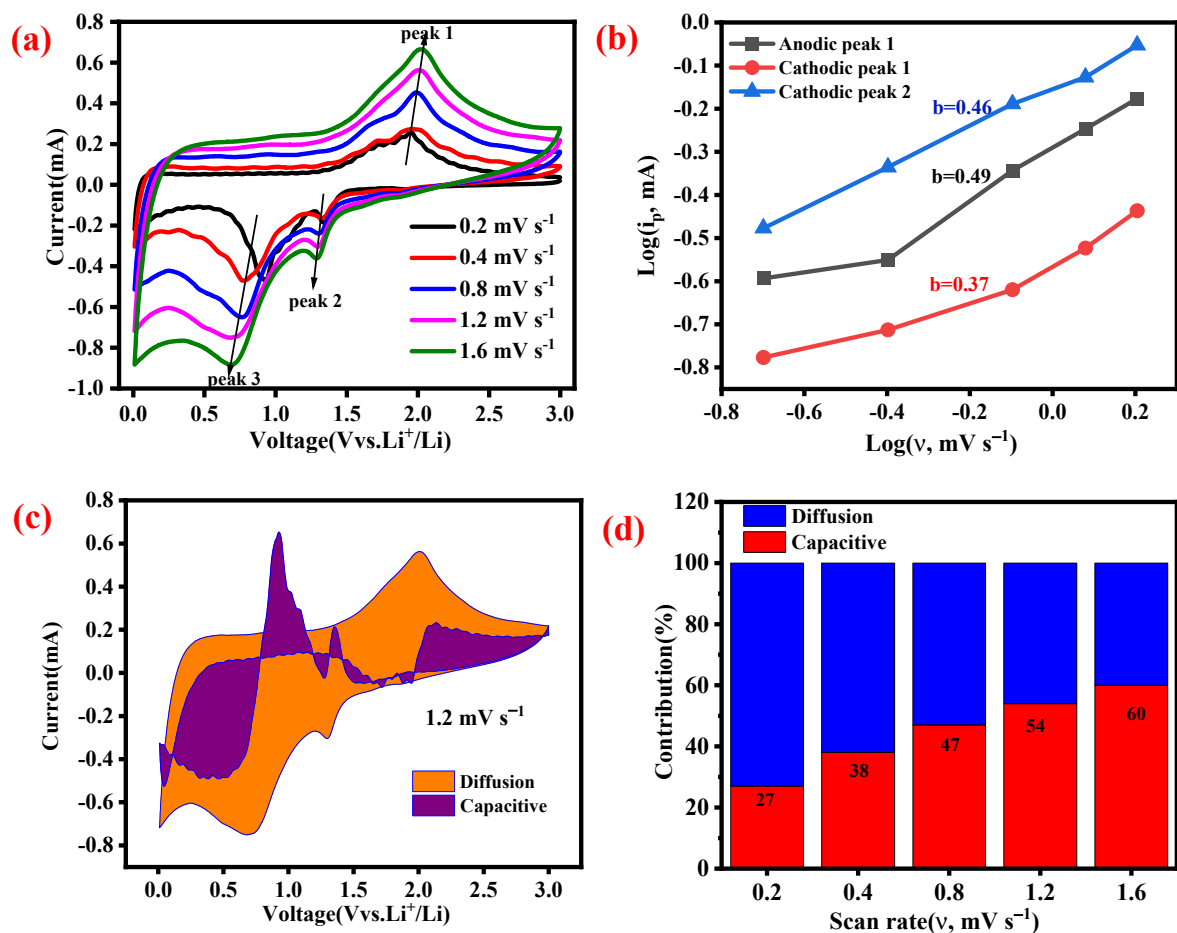


Figure S6. (a) CV curves of the FeS<sub>2</sub> electrode at different scan rates from 0.2 to 1.6 mV/s, (b) Linear plot of log peak current versus log scan rate of FeS<sub>2</sub>, (c) Capacitive and diffusion contribution of FeS<sub>2</sub> electrode @ 1.2 mV s<sup>-1</sup>, (d) Percentage of capacitive and diffusion contribution ratio of FeS<sub>2</sub> electrode at different rates.

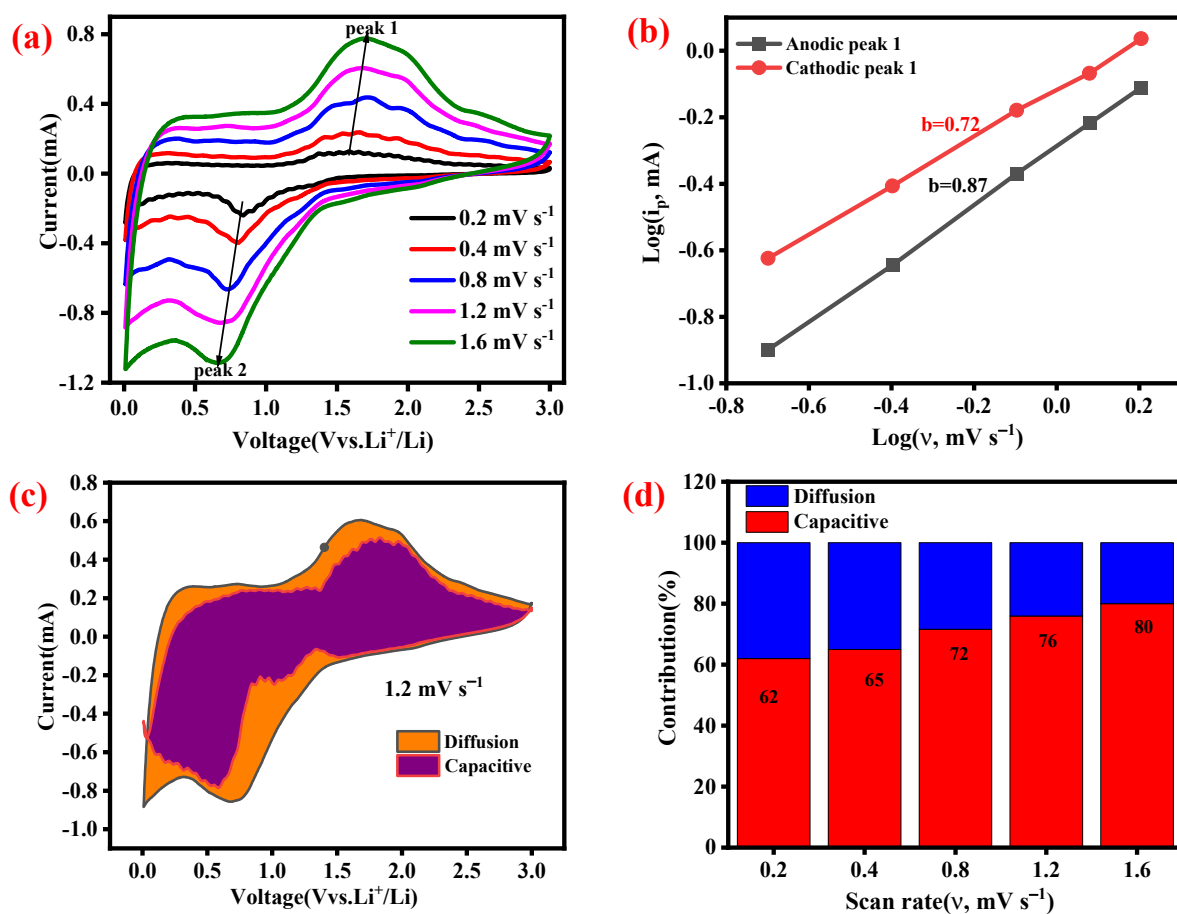


Figure S7. (a) CV curves of the ZnS-FeS<sub>2</sub> electrode at different scan rates from 0.2 to 1.6 mV s<sup>-1</sup>, (b) Linear plot of log peak current versus log scan rate of ZnS-FeS<sub>2</sub>, (c) Capacitive and diffusion contribution of ZnS-FeS<sub>2</sub> electrode @ 1.2 mV s<sup>-1</sup>, (d) Percentage of capacitive and diffusion contribution ratio of ZnS-FeS<sub>2</sub> electrode at different rates.

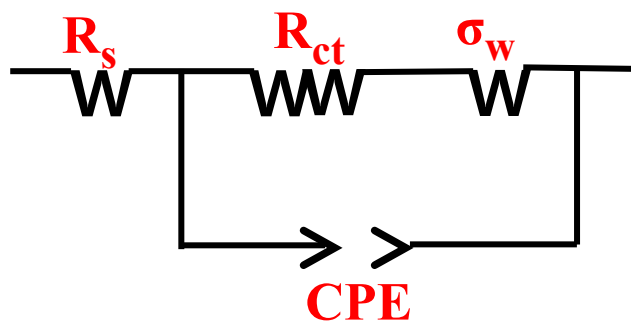


Figure S8. The fitted equivalent circuit of Nyquist plot of all the electrode materials.