

**Supporting information for**

**Electrochemical heavy metal removal from water using PVC waste-derived N, S codoped carbon materials**

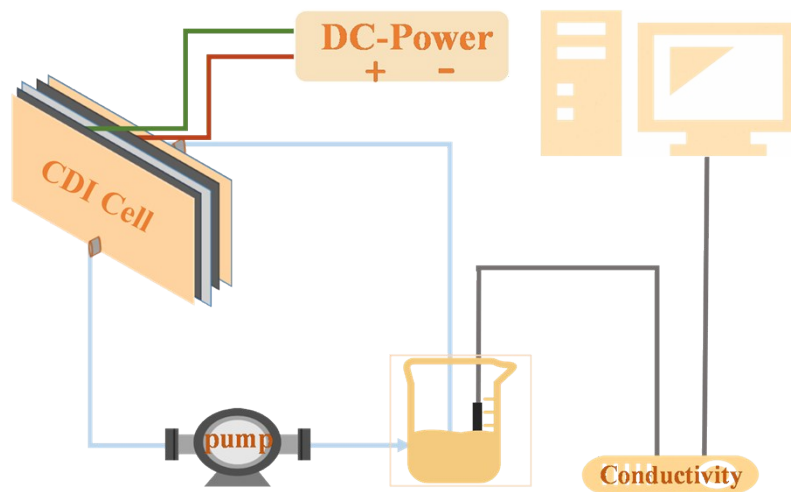
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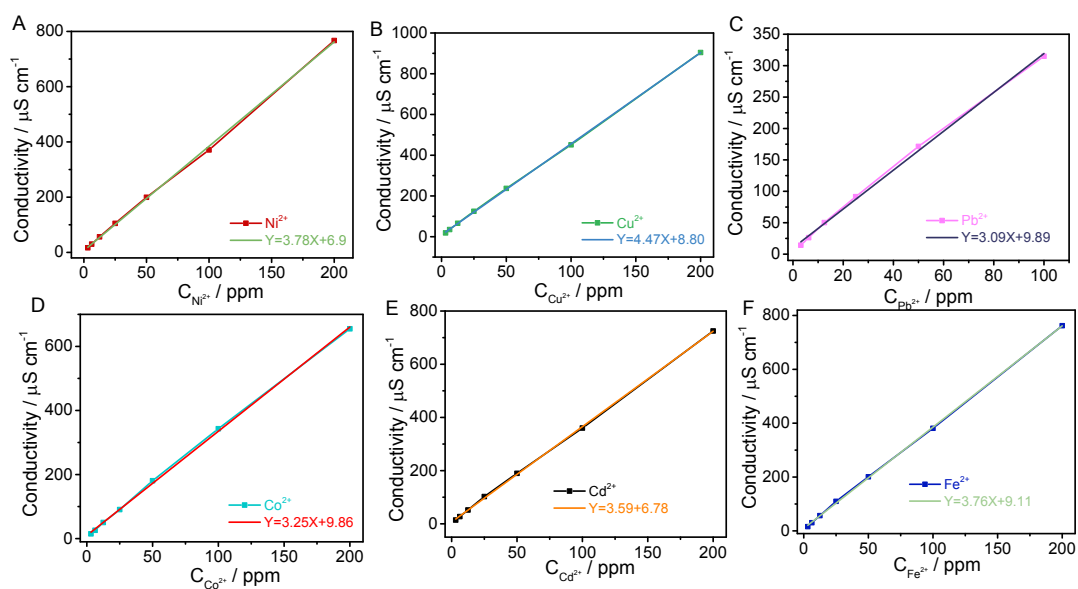
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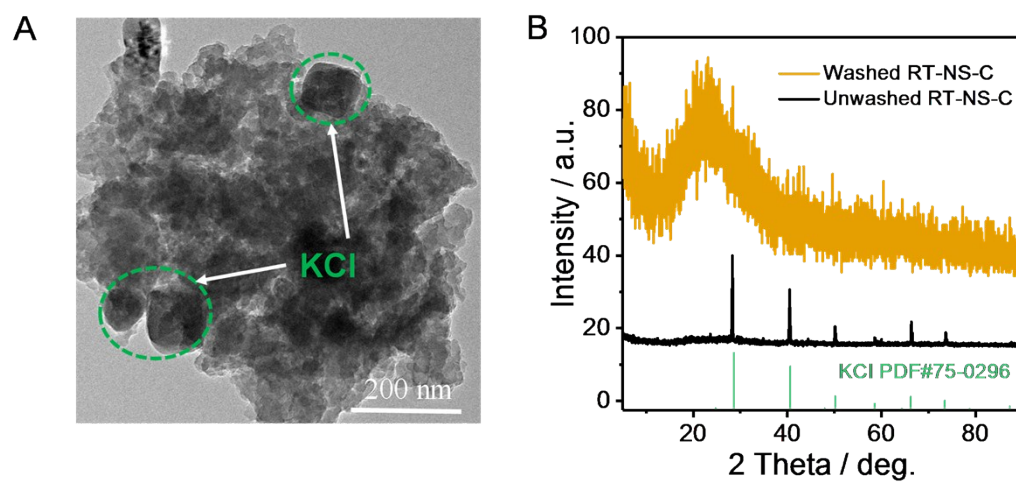
† These authors contributed equally to this work.



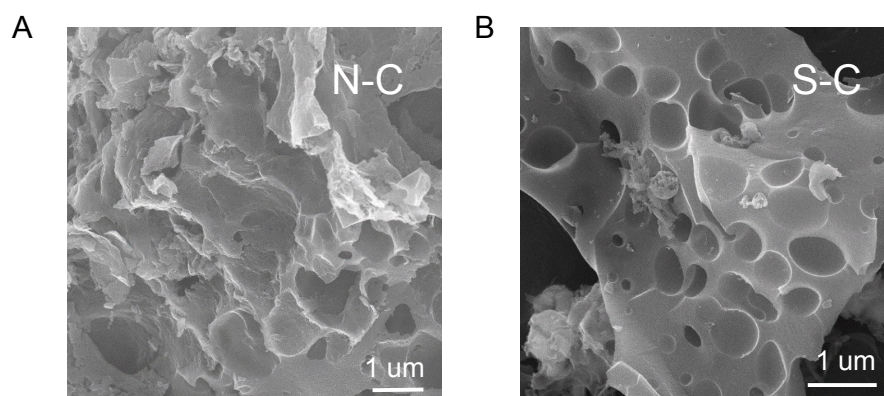
**Figure S1.** Scheme of integrated capacitive deionization apparatus.



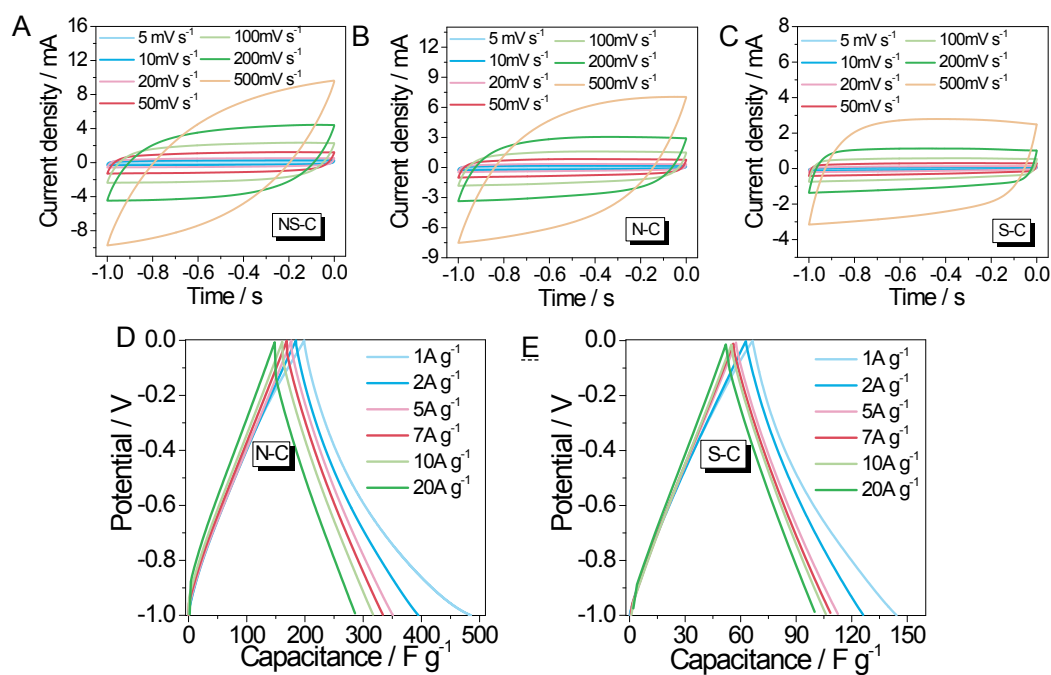
**Figure S2.** Plots of conductivity of solutions containing different types of metal ions versus the concentration of metal ions, the concentration of metal ions was measured by ICP techniques.



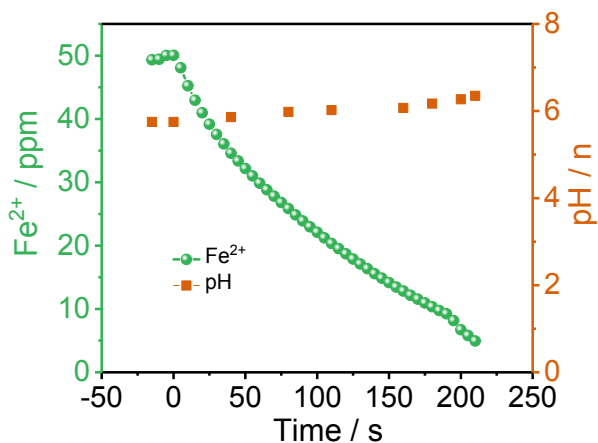
**Figure S3.** (A) TEM image of RT-NS-C. (B) XRD profiles of RT-NS-C before and after washing.



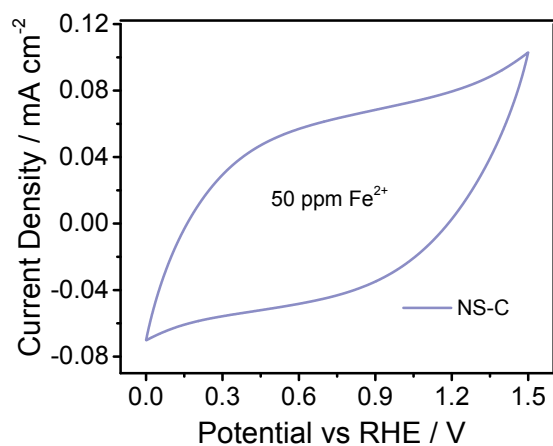
**Figure S4.** SEM images of (A) N-C and (B) S-C.



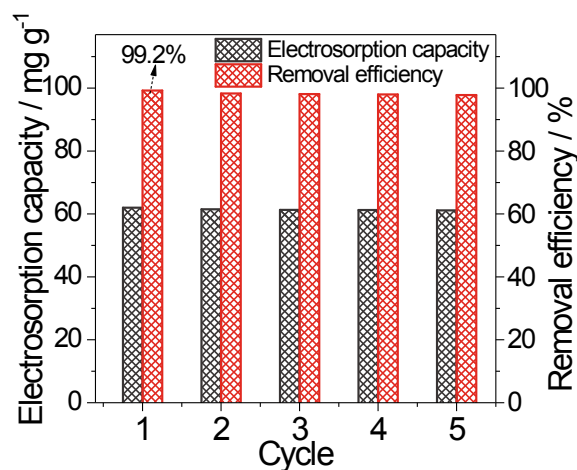
**Figure S5.** Supercapacitor measurements of NS-C/N-C/S-C in 1.0 M Na<sub>2</sub>SO<sub>4</sub> solution. (A-C) CV profiles at scan rate from 5 mV s<sup>-1</sup> to 100 mV s<sup>-1</sup>, (A) NS-C, (B) N-C, and (C) S-C. (D-E) charge/discharge curves at different current. (D) N-C, and (E) S-C.



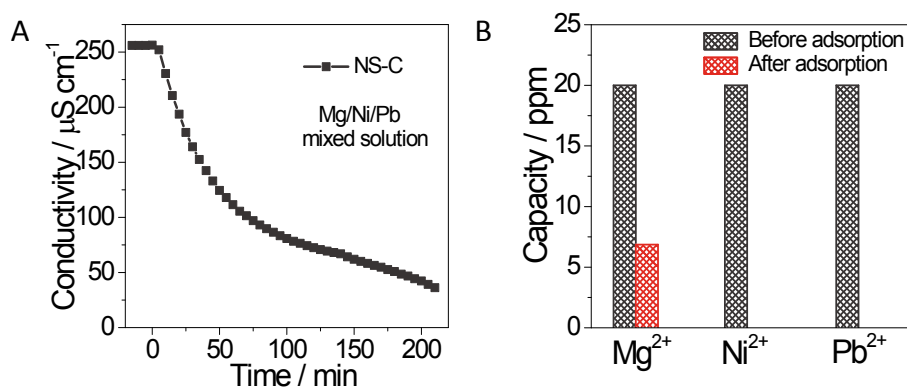
**Figure S6.** Deionization curves of Fe<sup>2+</sup>, and the corresponding pH value.



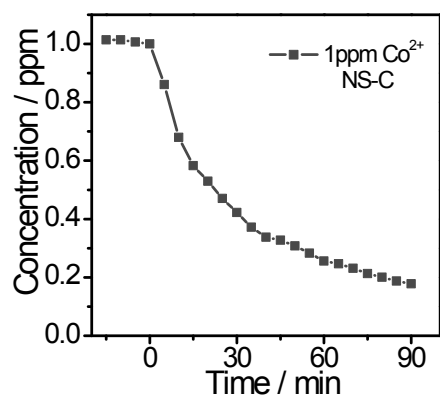
**Figure S7.** The cycle voltammograms curves of NS-C in 50 ppm  $\text{FeCl}_2$ , scan rate = 5  $\text{mV s}^{-1}$ .



**Figure S8.** Adsorption capacities and efficiencies for  $\text{Fe}^{2+}$  from cycle 1 to 5.



**Figure S9.** (A) Deionization curve of NS-C in the mixed solution of  $\text{Mg}^{2+}/\text{Ni}^{2+}/\text{Pb}^{2+}$  ions, and (B) ion concentrations in the mixed solution before and after deionization.



**Figure S10.** Deionization curve of 1 ppm Co<sup>2+</sup> using NS-C electrode.