

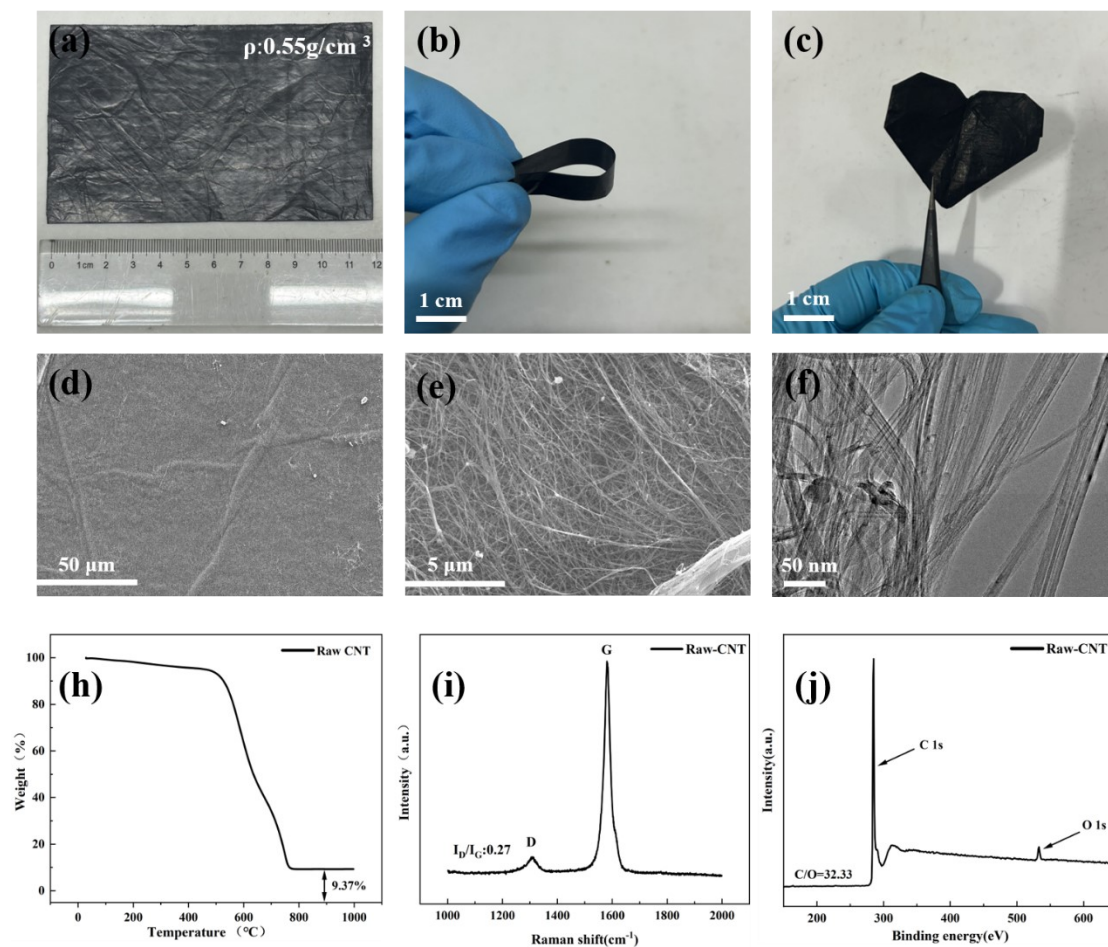
## Supporting Information

### **A Fast, Efficient and Reversible Approach to Enhance the Electrical Conductivity of Carbon Nanotube Films**

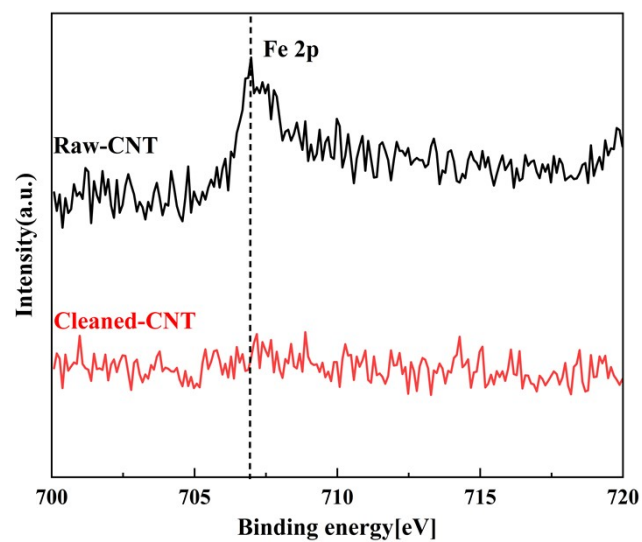
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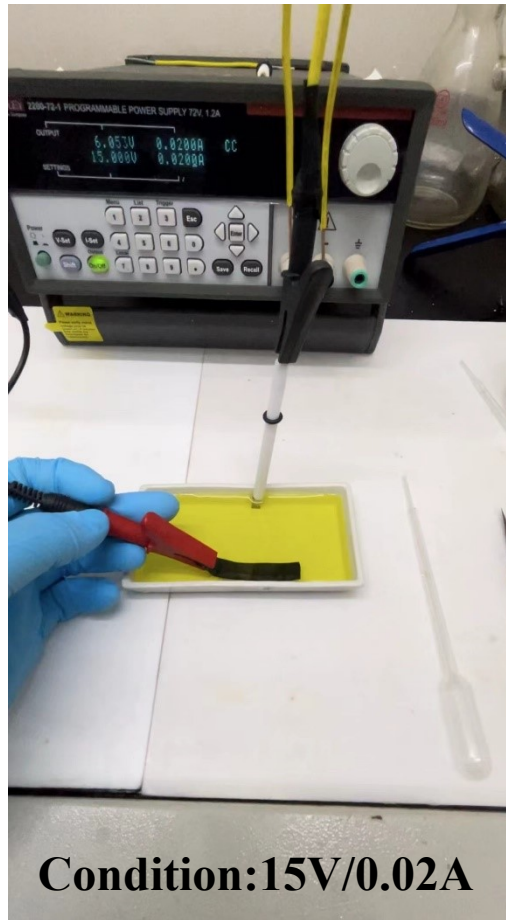
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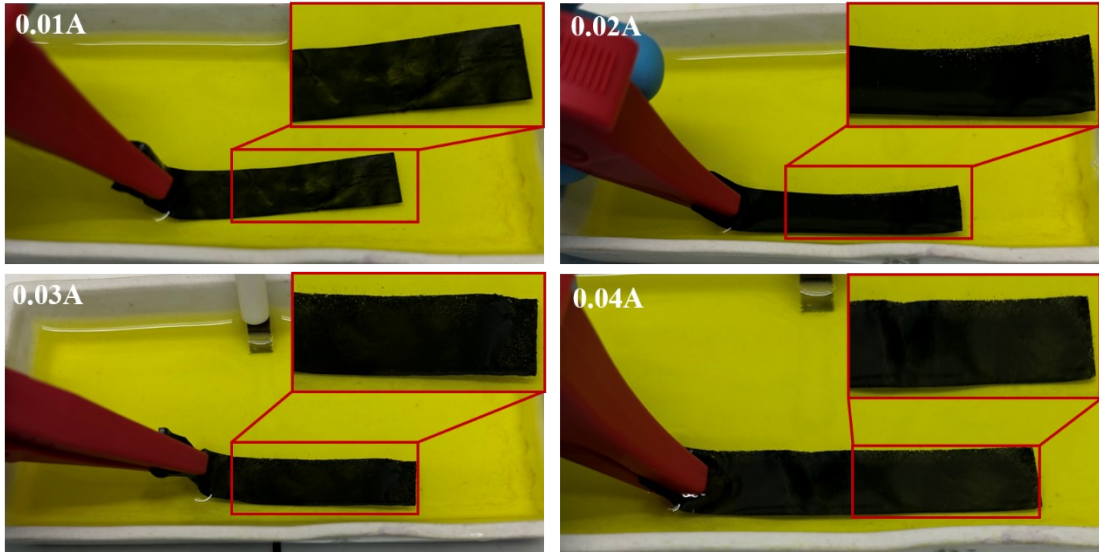
**Figure S1** Characterization of the raw carbon nanotube films.



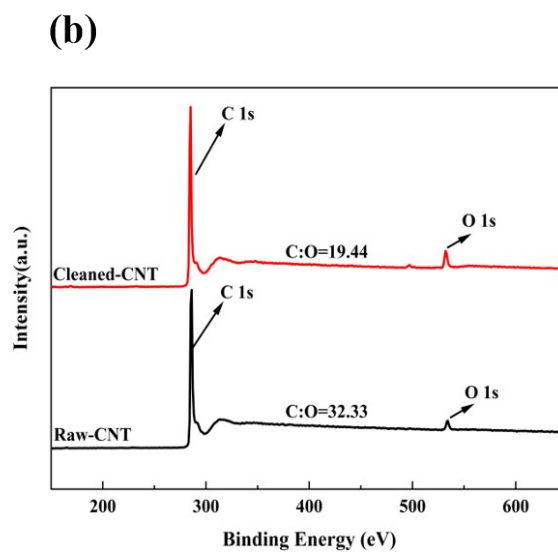
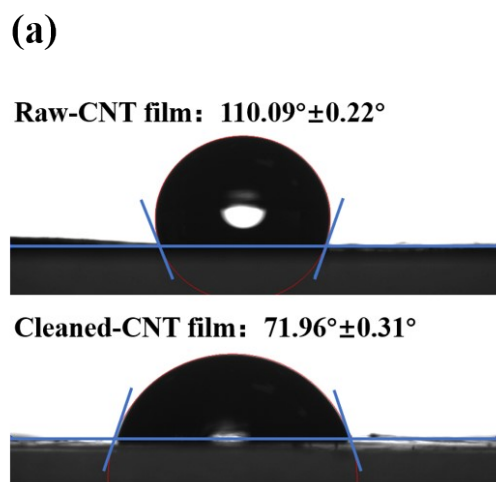
**Figure S2** Comparison of Fe 2p spectra in Raw and Cleaned CNT films



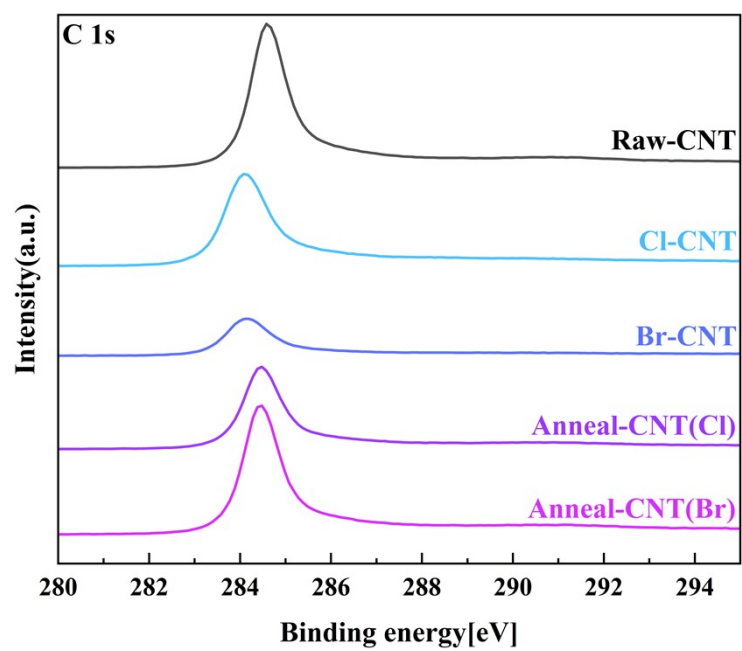
**Figure S3** Schematic diagram of the electrolysis system: it consists of a DC power supply, platinum electrodes, electrolyte, electrode clips, carbon nanotube films and a porcelain boat.



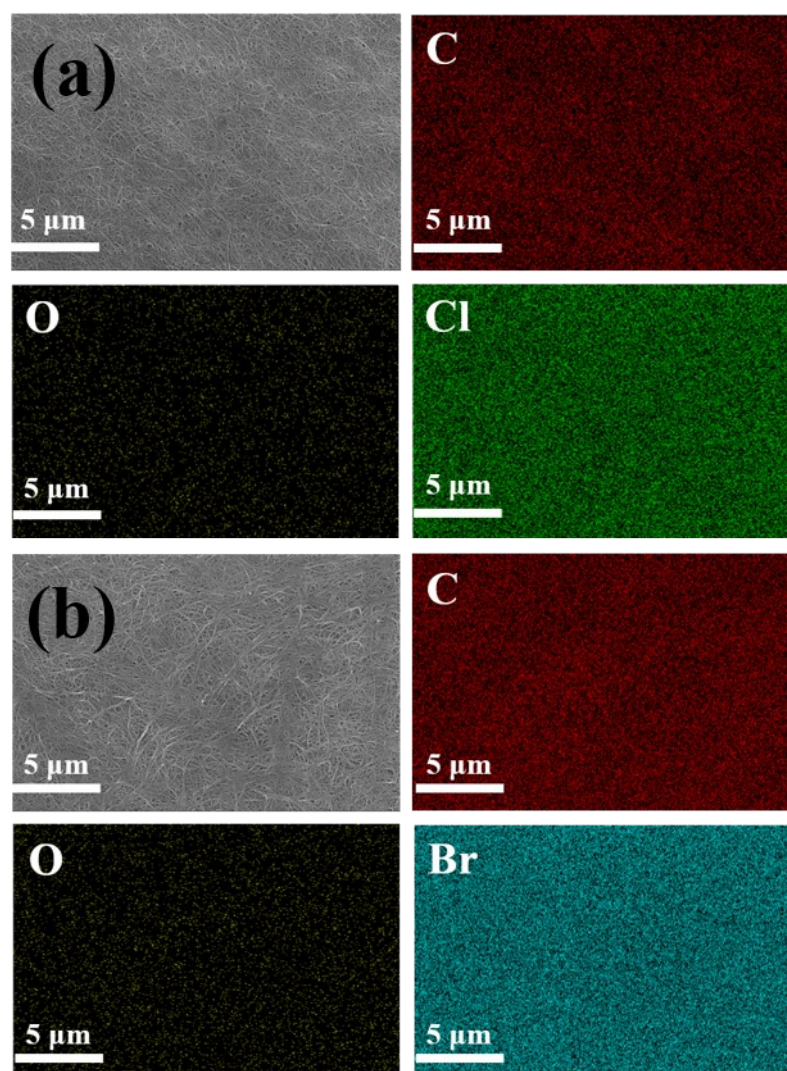
**Figure S4** Bubble condition at different currents.



**Figure S5** Comparison of contact angle and carbon/oxygen ratio of carbon nanotube films before and after cleaning.

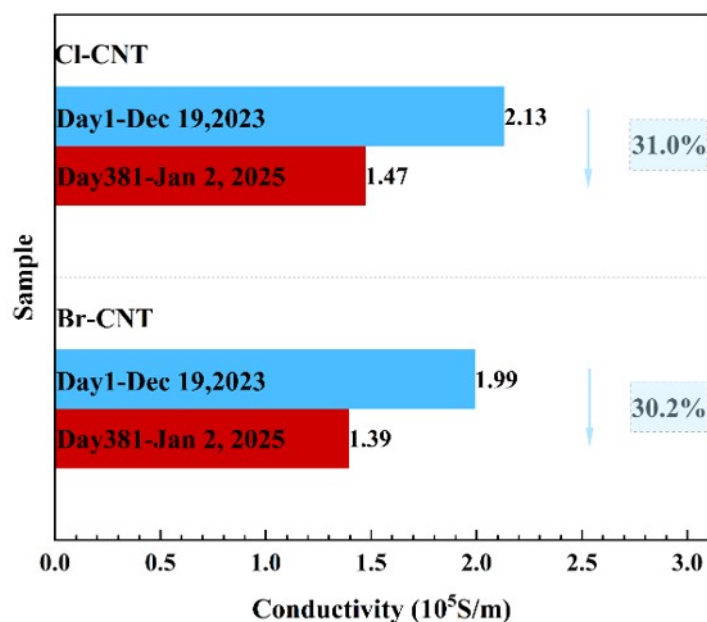


**Figure S6** C 1s electron transfer spectrum



**Figure S7** Elemental mapping of Cl-CNT and Br-CNT.





**Figure S8** The effect of monitoring time on the conductivity of CI-CNT and Br-CNT at room temperature.

We monitored the samples at room temperature to observe the effect of time on the conductivity of the samples. The conductivity of the two samples that were monitored for the longest period of time are shown in **Figure S9**. The decrease in conductivity of CI-CNT and Br-CNT after almost 400 days of monitoring was approximately 30%. Even with the 30% decrease, the material still retains a high conductivity.