# Supplementary information

## The wasted Rose-derived Porous Carbon with a Unique Hierarchical Heteroatom-Enriched Structure as a High-Performance Supercapacitor Electrode

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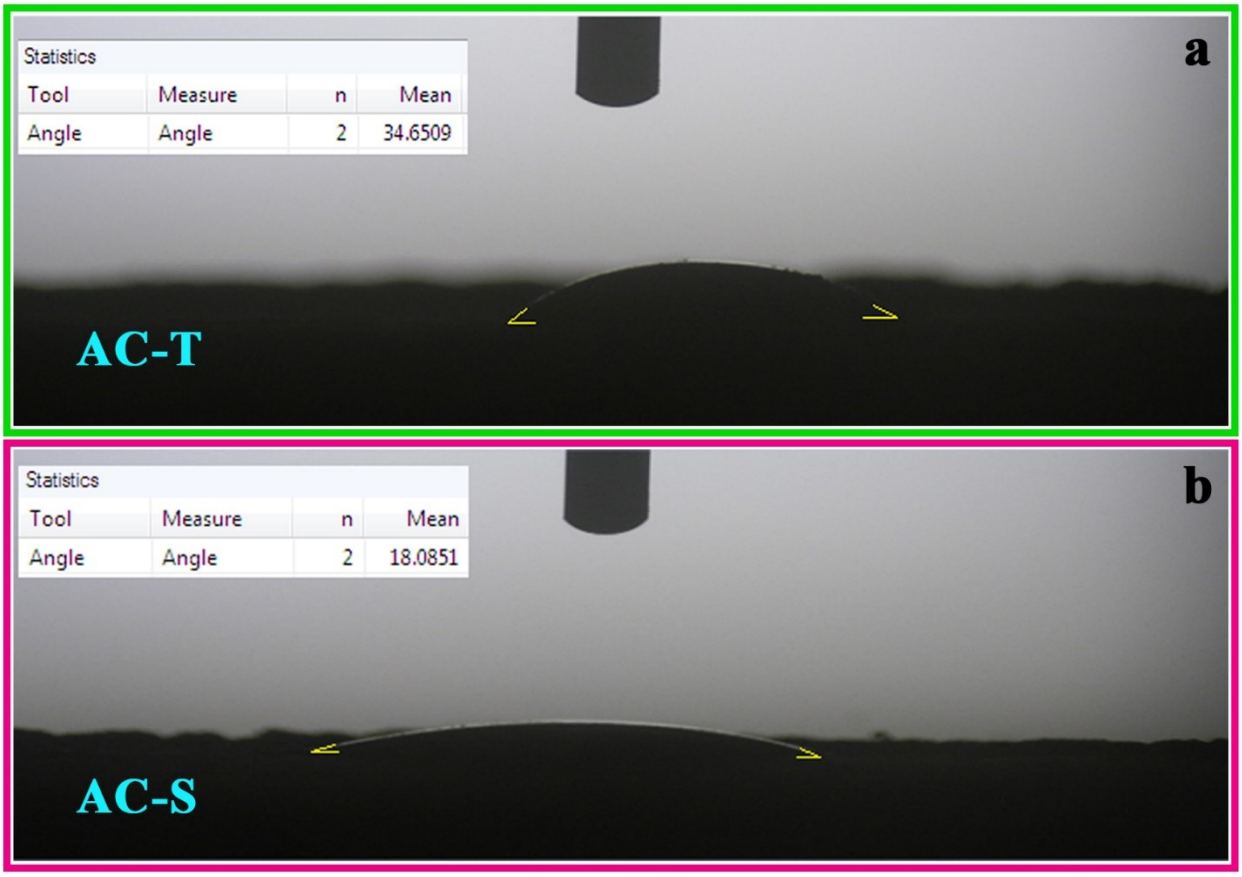


Fig S1. Water drop contact angle test on (a) AC-T and (b) AC-S sample.

**Table S1** chemical composition and the fraction of different type of nitrogen in AC-T and AC-S.

| Sample | Chemical composition (at. %) | | | | | Fraction of different type of nitrogen (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | O | N | S | P | Pyridinic | Pyrrolic | Graphitic | Quaternary | Oxide | Pyridine oxide |
| AC-S | 89.70 | 8.44 | 1.72 | 0.13 | – | 16.52 | 60.28 | 16.86 | – | 6.34 | – |
| AC-T | 90.98 | 6.04 | 1.75 | 0.12 | 1.11 | 32.74 | 40.27 | – | 26.23 | – | 0.76 |

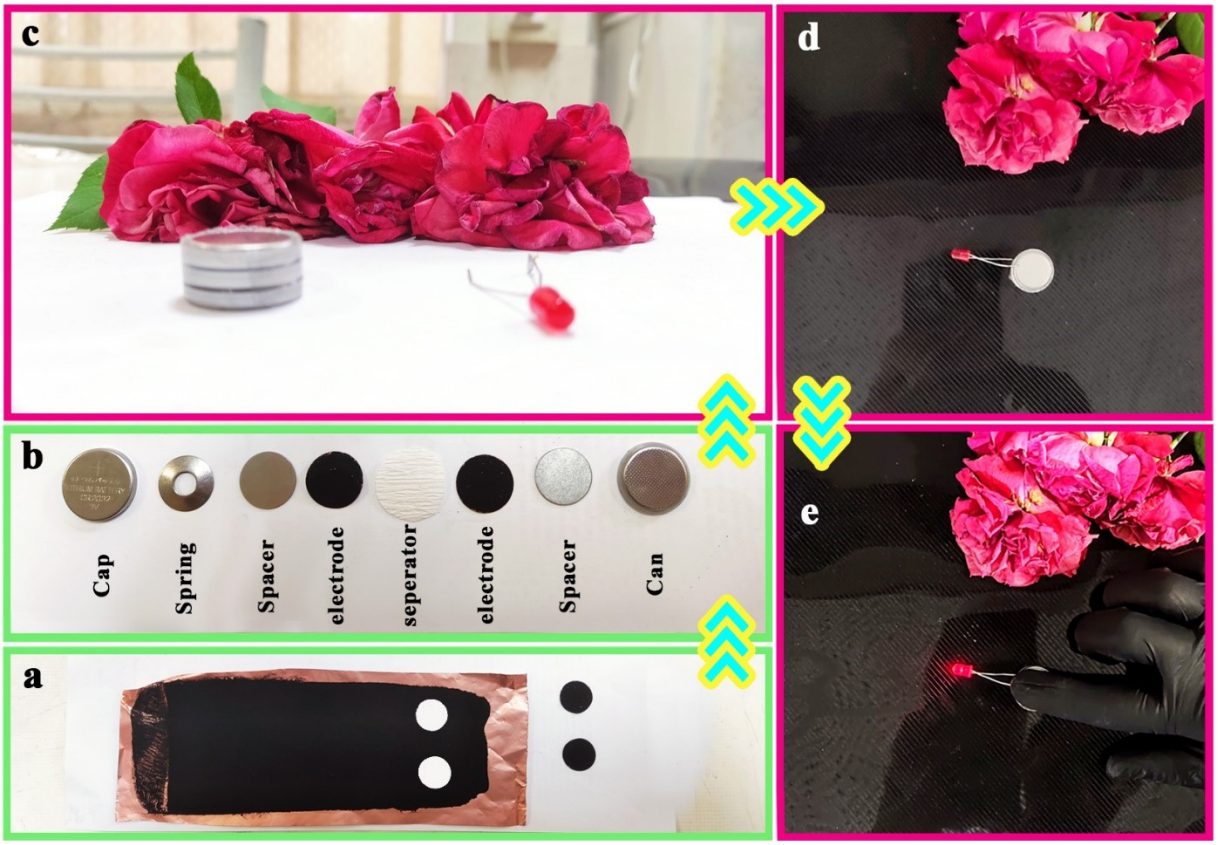


**Fig S2**. (a) coated material on Cu foil, (b) coin cell configuration of symmetric supercapacitor device, (c) series of three coin cells with 6 M KOH electrolyte and a red light-emitting diode (LED), (d) the LED light before connection, and (e) glowing LED connected to three devices in series.

For validation the practical performance of the proposed AC, further investigation carried out by fabricating symmetric coin cell supercapacitor utilizing AC-S as the electrode and 6 M KOH as the electrolyte. AC-S as the active material was mixed with carbon black and polyvinylidene difluoride (PVDF) by a mass ratio of 80:10:10. The mixture dispersed homogeneously in N-Methyl-2-pyrrolidone (NMP) solvent. The obtained slurry was coated on cupper foil using doctor blade carefully to fabricate an electrode with a uniform surface and good connection between the material and the subtract (**Fig S2**a). About 2 mg of the AC-S was loaded on the foil for each of the electrodes. At the next step, coin cells were made using the configuration exhibited in **Fig. S2**b. Three coin cells were put in series, as shown in **Fig. S2**c, to supply enough potential to turn on the light-emitting diode (LED). After the charging process, the series coni cells

connected to LED. It could successfully supply the required energy to turn on the LED (**Fig. S2**d and **Fig. S2**e, demonstrate the situation of LED before and after the electrical connection, respectively). Further, the video (S2) demonstrates the performance of the series coin cells.