Supporting information for

Copper-Carbon Nanotube Composites Enabled by Electrospinning for Advanced Conductors

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Table S1. Electrospinning process parameters.

CNT dispersion formulation	PVP concentration (wt.%)	Feeding rate (mL/h)	Voltage (kV)	Time (h)	Speed (rpm)
H_2O/EtOH/PVP	7.5	0.5	15	5	700
H_2O/EtOH/PVP	2	0.5	15	5	700
DMF	N/A	0.5	15	5	700
DMF/PVP	10	0.5	15	5	700
DMF/PVP	10	0.5	15	5	3000
DMF/PVP	7.5	0.5	15	5	3000
DMF/PVP	5	0.5	15	5	3000

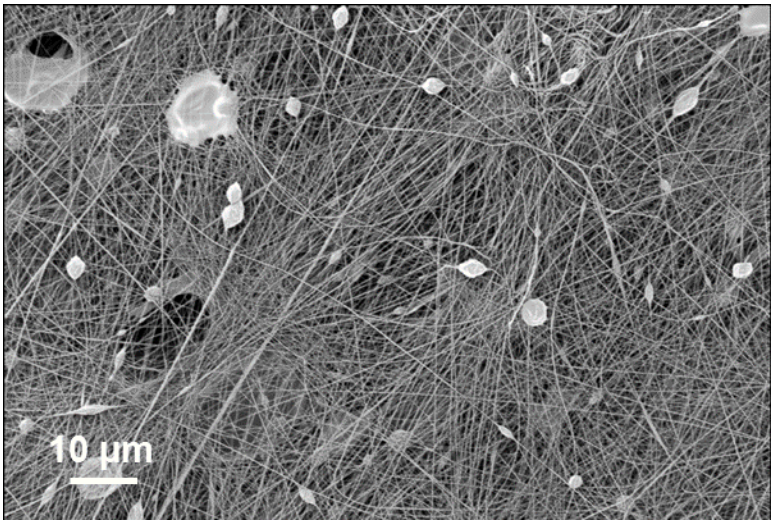

Figure S1. Typical SEM images of electrospun CNT fibers at a low collector speed (700 rpm) on Cu prepared from 10 wt.% PVP containing DMF dispersion.

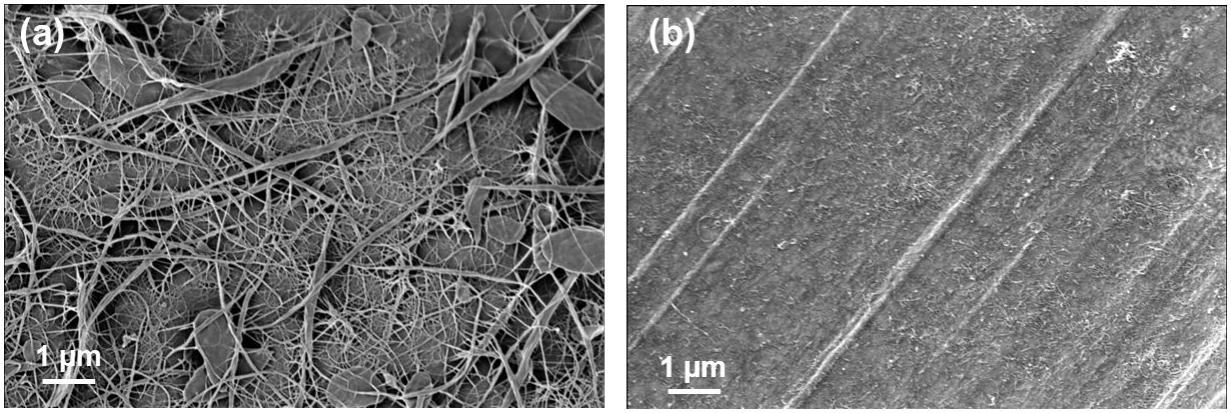

Figure S2. Surface morphologies of the CNT coatings prepared by the only DMF (no PVP) solution (a) before and (b) after the heat treatment at 600°C. The longitudinal marks in (b) were induced during the rolling process of Cu tapes.

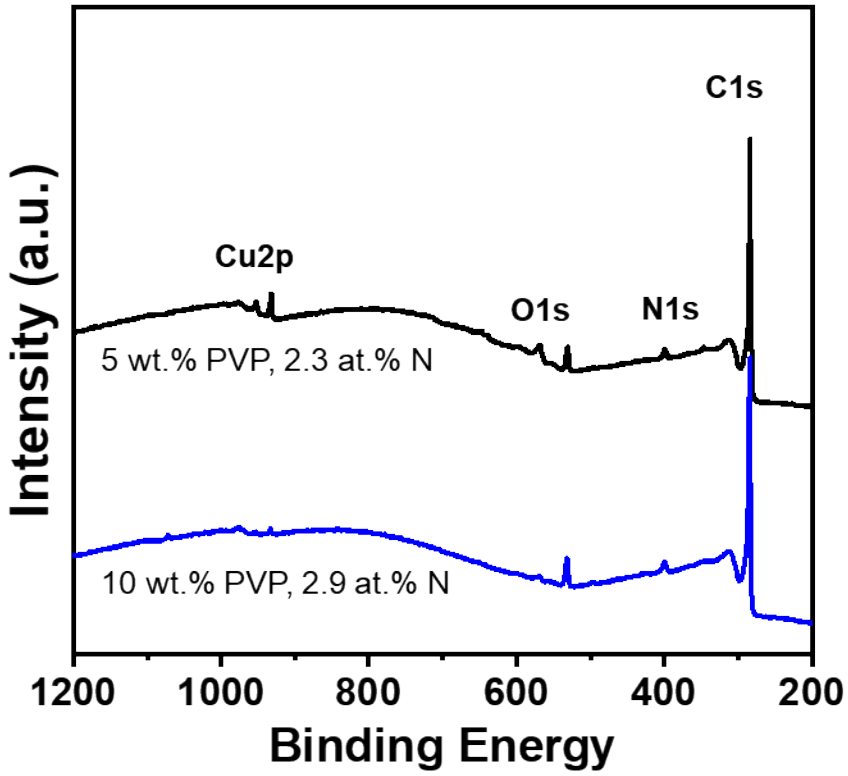

Figure S3. XPS survey data collected for the CNT coated Cu samples prepared from 5 wt.% and 10 wt.% PVP containing solutions.

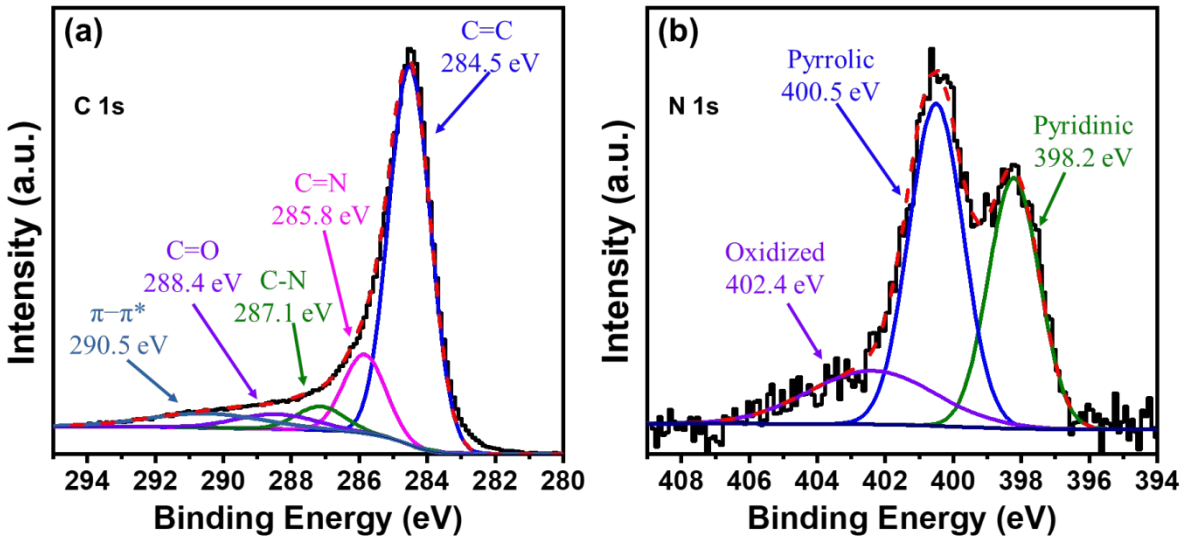

Figure S4. High-resolution XPS C 1s and N 1s spectra of CNT coating (10 wt.% PVP) after the heat treatment at 600 °C.

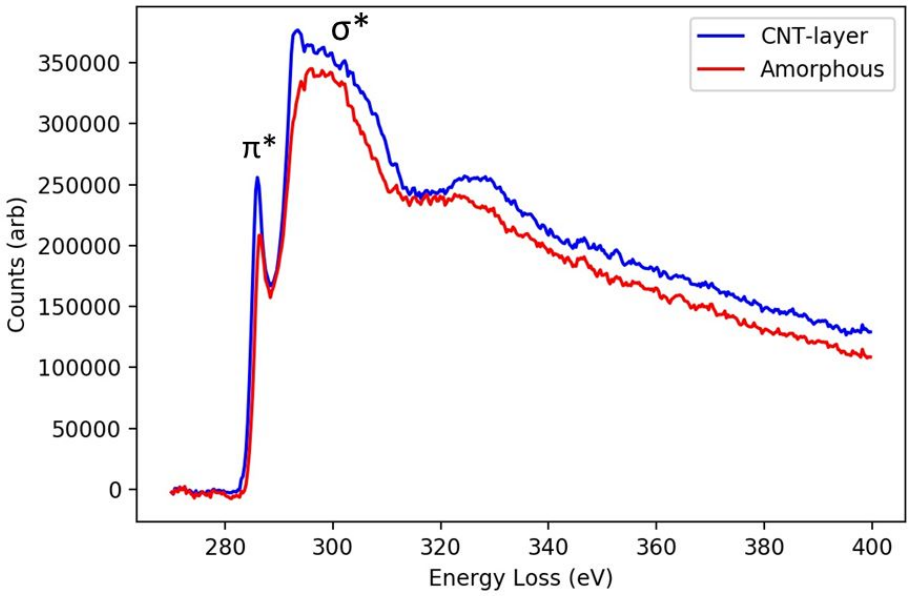

Figure S5. EELS data acquired at 100 kV from 10 wt.% PVP sample. Background-subtracted EELS data showing the carbon K-edge, from the CNT-layer and from the protective carbon coating on top of the sample exhibit different shapes, particularly at the onset of the σ* peak, because of the different carbon bonding.

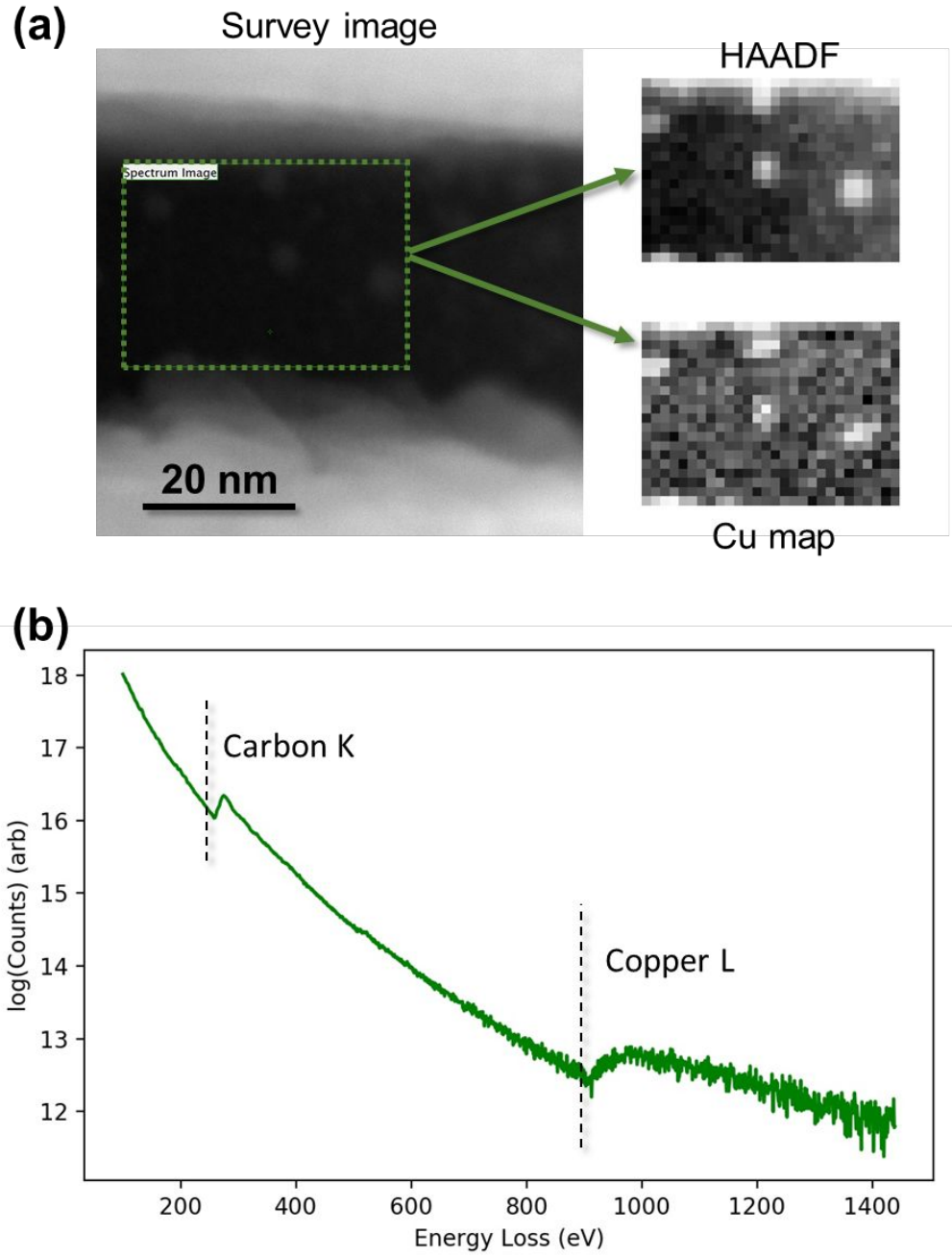

Figure. S6. (a) HAADF image shows nanoparticles in the CNT layer. Simultaneously acquired EELS image, showing the integrated Cu signal, reveals the nanoparticles in the CNT layer contain copper. EELS data acquired at 100 kV from the 10 wt.% PVP sample. (b) Summed data (on a logarithmic intensity scale) indicates the EELS edges used to produce elemental maps.