Supporting Information

Bio-Inspired Hierarchical Carbon Nanotube Yarn with Ester Bond Cross-Linkages towards High Conductivity for Multifunctional Applications

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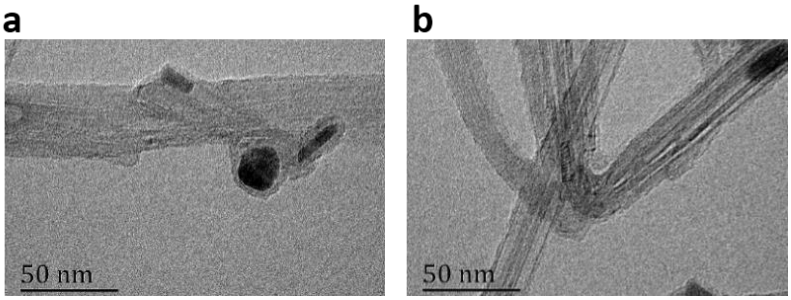

Figure S1. Please add a separate caption.

Figure S1 TEM of pristine CNT (a) and functionalized CNT (b) amorphous carbon was removed after the acid treatment. The functionalized CNT sample shows a wavy or bumpy and irregular surface, presenting functional groups which could be attributed to the esterification of CNTs [25,26].

The electrical conductivity (σ) of CNT yarns is calculated as:

$$\sigma = L / RA \text{ (S cm}^{-1}\text{)}$$

Where R, A, and L are the resistance, cross-sectional area, and length of the specimen.

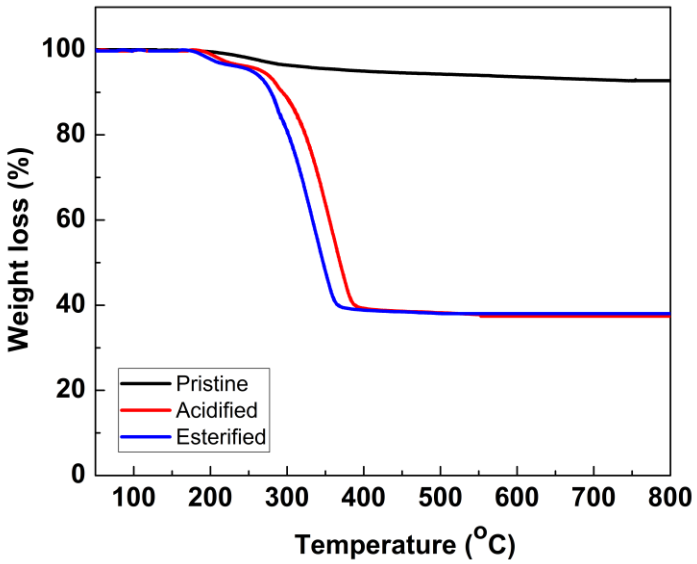

Figure S2. TGA of CNT yarn in Nitrogen Supply.

Figure S2 evaluated thermal gravity analysis (TGA) under nitrogen to assess the degradation behavior of CNT yarns for conductive applications. As chemical treatment caused defects (functional groups) on stable structure of CNTs thus results in early degradation [37]. TGA results verified that pristine CNT yarn remained stable in nitrogen supply up to 800 °C while treated CNT yarn started degradation at 280 °C.