# Electrochemical Properties Enhancement of Flexible Textile Based Supercapacitor

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CNT coated textile supercapacitors are especially well-suited for wearable energy storage device applications due to their double porous structure. To compare electrochemical properties of different interaction between carbon nanotube and textiles, two different carbon nanotube coated textiles based on polyester and cotton with different mechanical behaviors[1] were examined. The effects of mechanical straining on carbon nanotube coated textiles are studied.we demonstrate that the specific capacitance as well as power and energy densities can be enhanced by pre-straining of the textile. In addition, $MnO_2$ pseudocapacitor nanoparticles were added to the CNT coated textile to further enhance electrochemical properties.

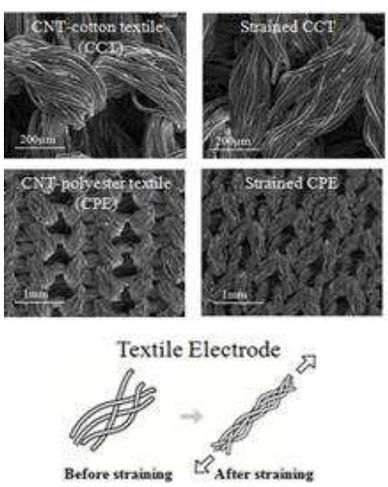


**Figure 1. In-situ resistance measurement during mechanical tensile straining of CNT-polyester (CPE) and CNT-cotton (CCT)**

Our results indicate that the simple mechanical pre-straining of the textile fibers and incorporation of MnO2 nanoparticles can contribute to significant enhancements in the electrochemical performance of the supercapacitors, where the highest specific capacitance, power and energy densities were measured to be 351F/g, 17.6Wh/kg , 14.2kW/kg, respectively.

**Acknowledgment**

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**Reference**

1. Stretchable, Porous, and Conductive Energy Textiles Liangbing Hu,†Mauro Pasta,†Fabio La Mantia,†LiFeng Cu†Sangmoo Jeong,‡Heather Dawn Deshazer,†Jang Wook Choi,†Seung Min Han,†and Yi Cui†Nano Lett., 2010, 10 (2), pp 708–714.

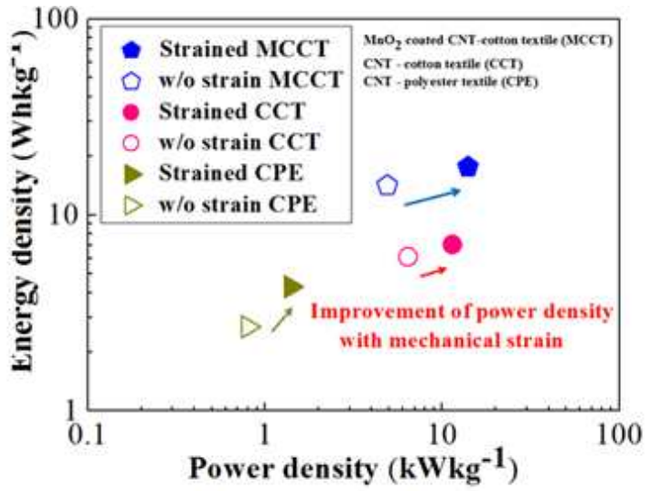


**Figure 2. Ragone plot of CNT-polyester (CPE), CCT, MCCT with and without mechanical pre-straining.**