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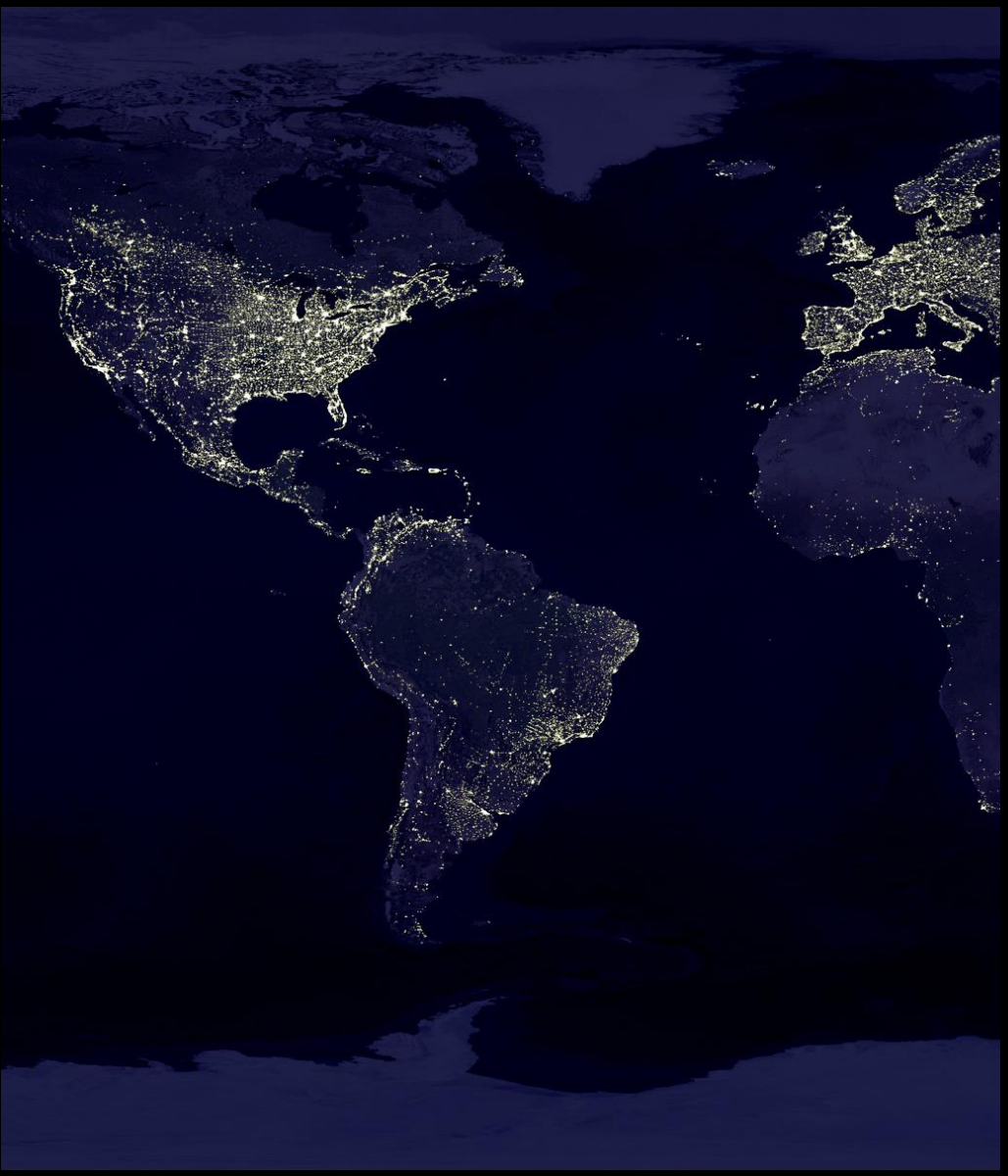
High Performance Supercapacitor Device Based on Polymer Derived Carbon Nanofiber with Enhanced Capacity at Elevated Temperatures

Charith Ranaweera
Pittsburg State University

“Earth’s city lights” image by NASA

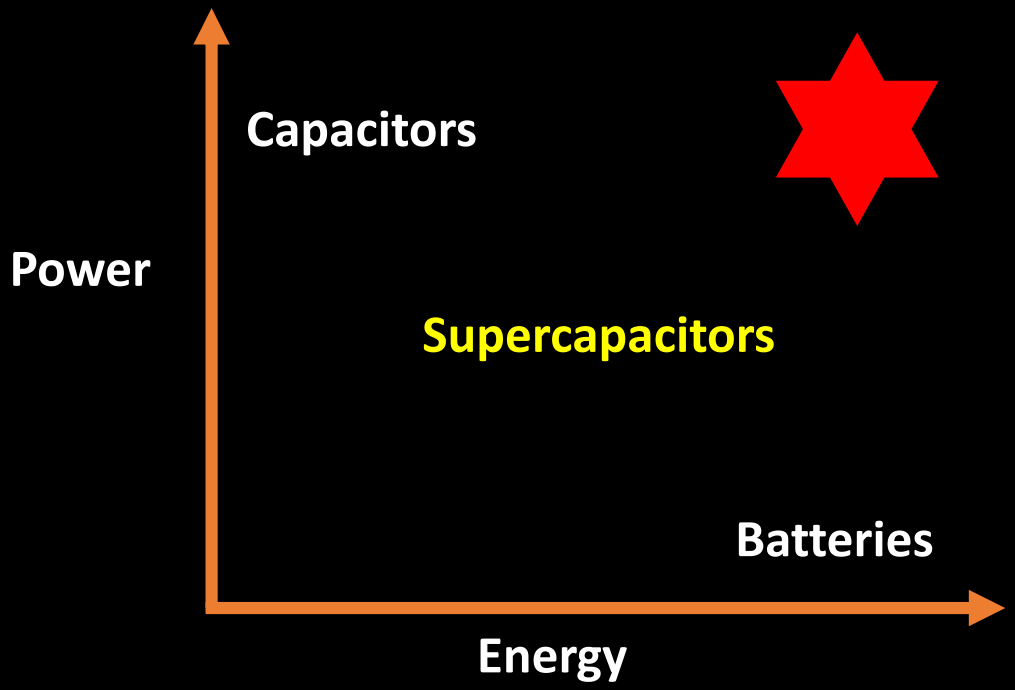


Polymer derived carbon nanofiber embedded cobalt oxide for efficient supercapacitors

C.K. Ranaweera, S. Bhoyate, C. Zhang, P. K. Kahol, R. Gupta

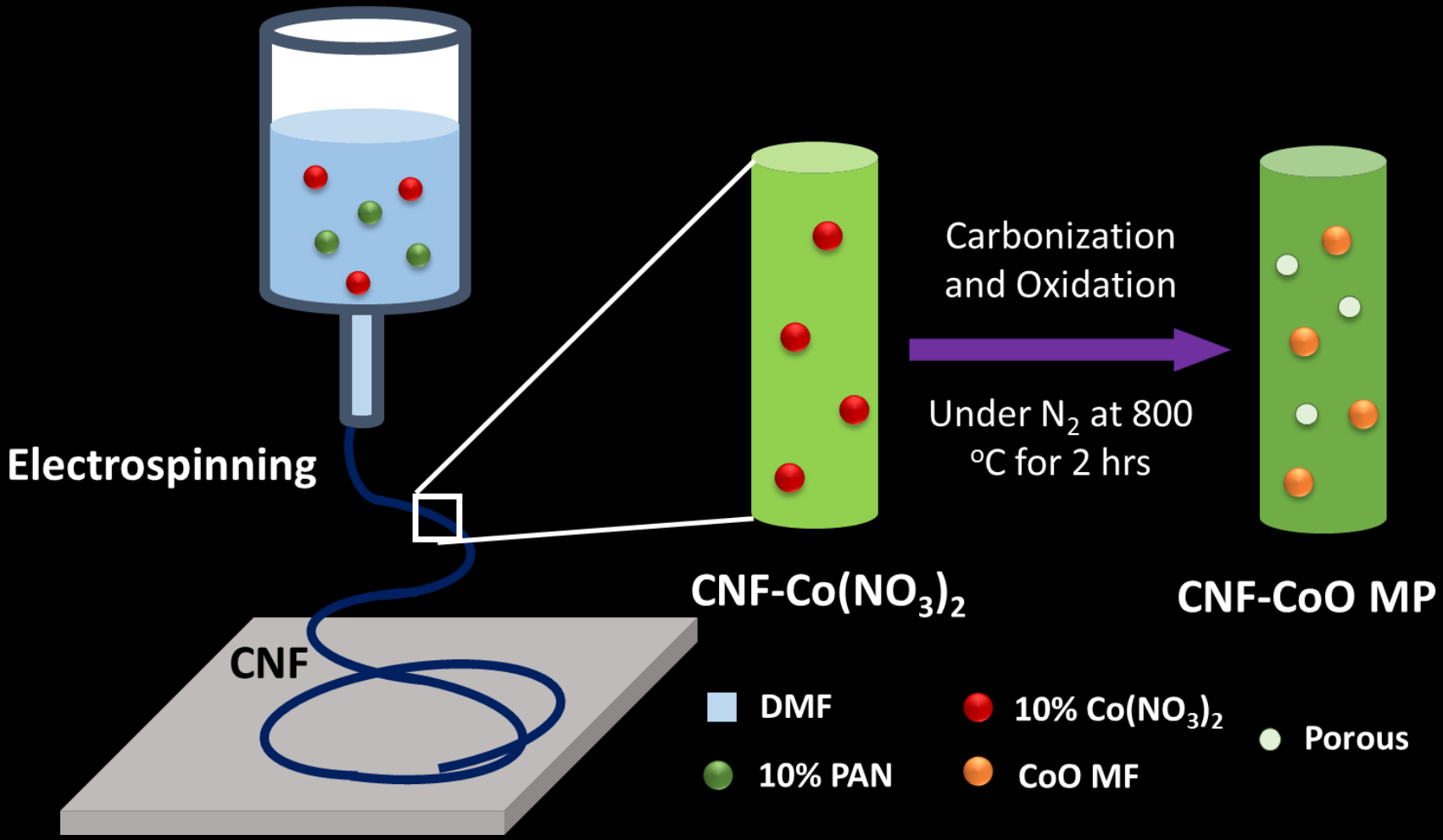
Presented by
Charith K. Ranaweera

Supercapacitors for energy storage

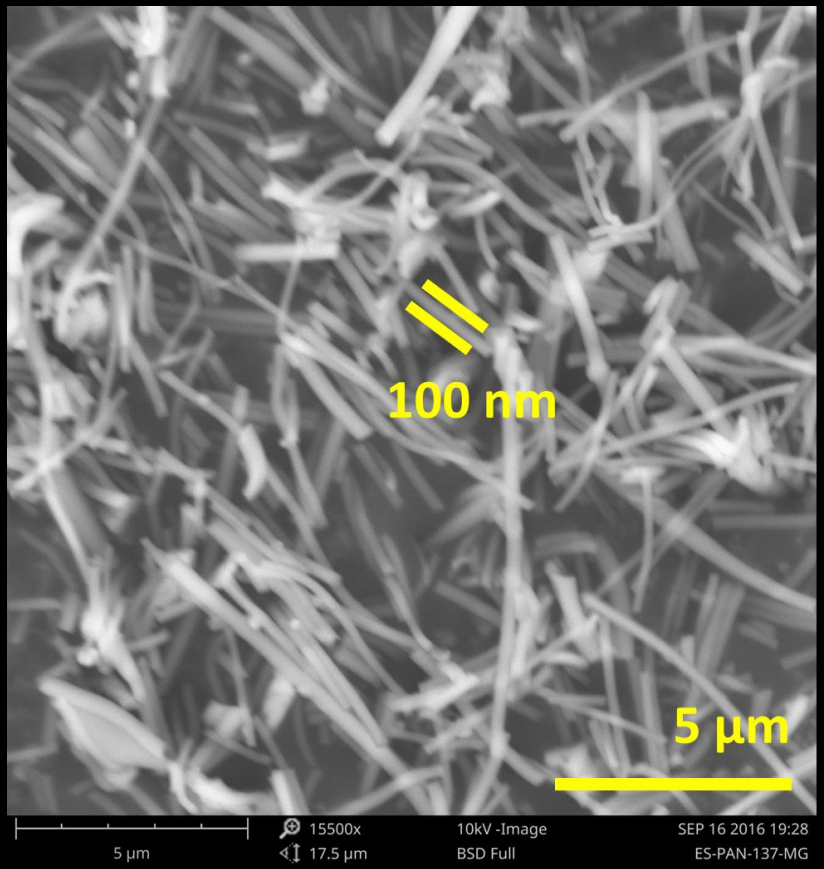


- Pulse power supply
- Rapid charging time
- Outstanding service life
- Operational safety

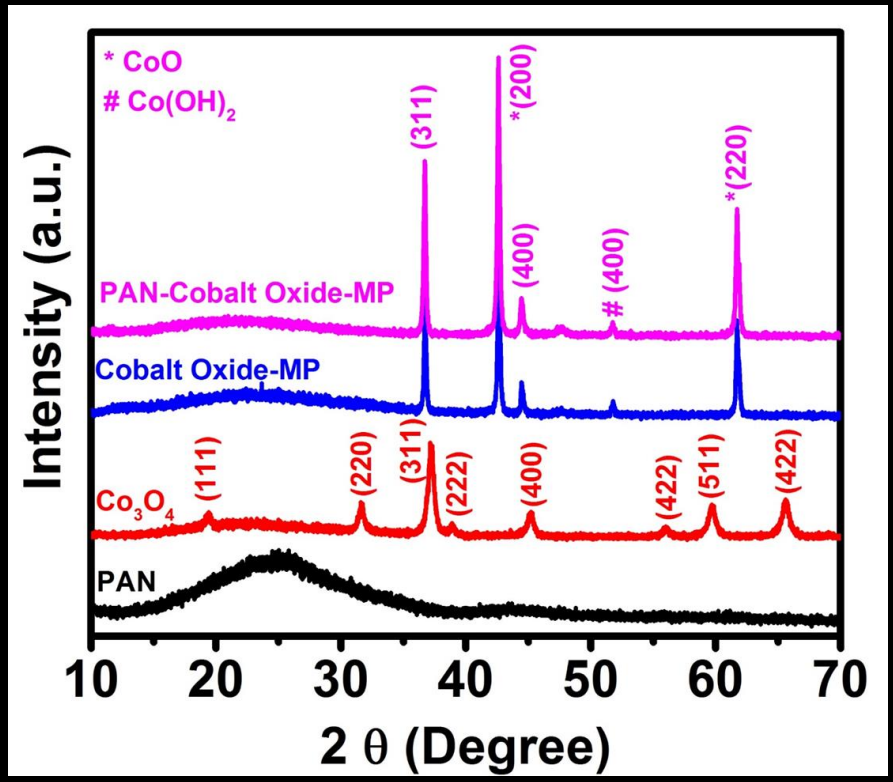
Synthesis of cobalt embedded carbon nano fibers



Microstucture of cobalt embedded carbon nano fibers

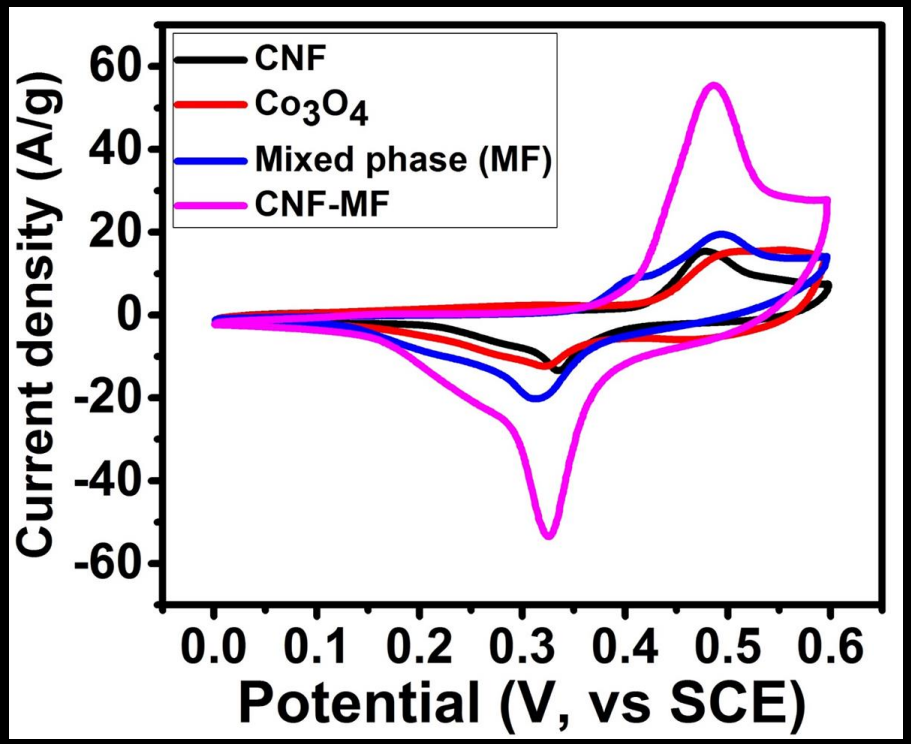


Diameter of the carbon nano fibers are around 100 nm

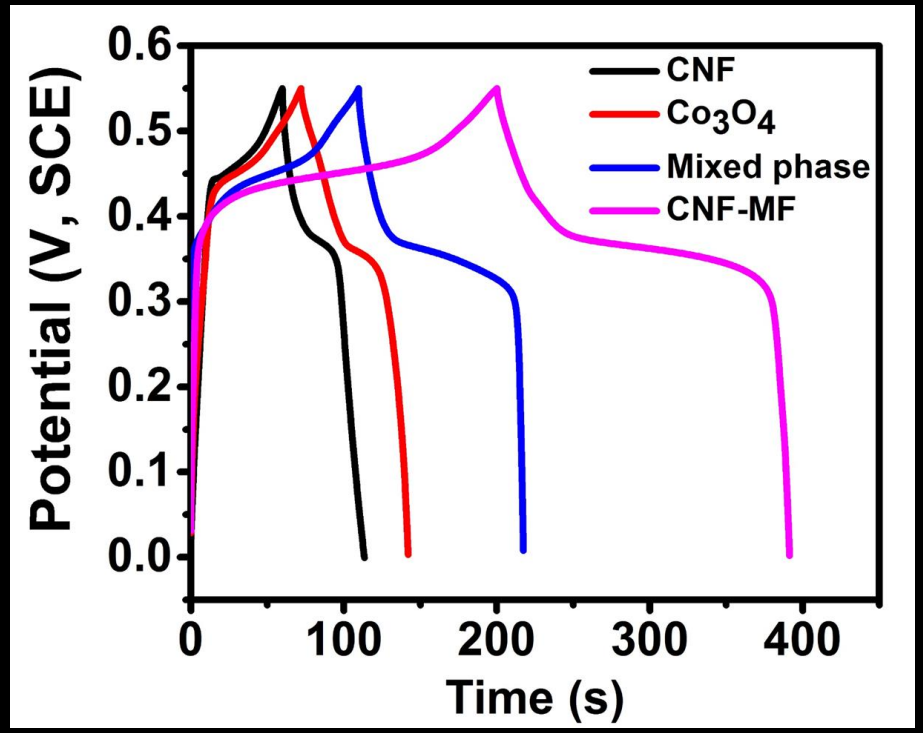


XRD spectra of highly crystalline cobalt oxides, amorphous CNF, and their composites

Capacitive performance of cobalt embedded carbon nano fibers

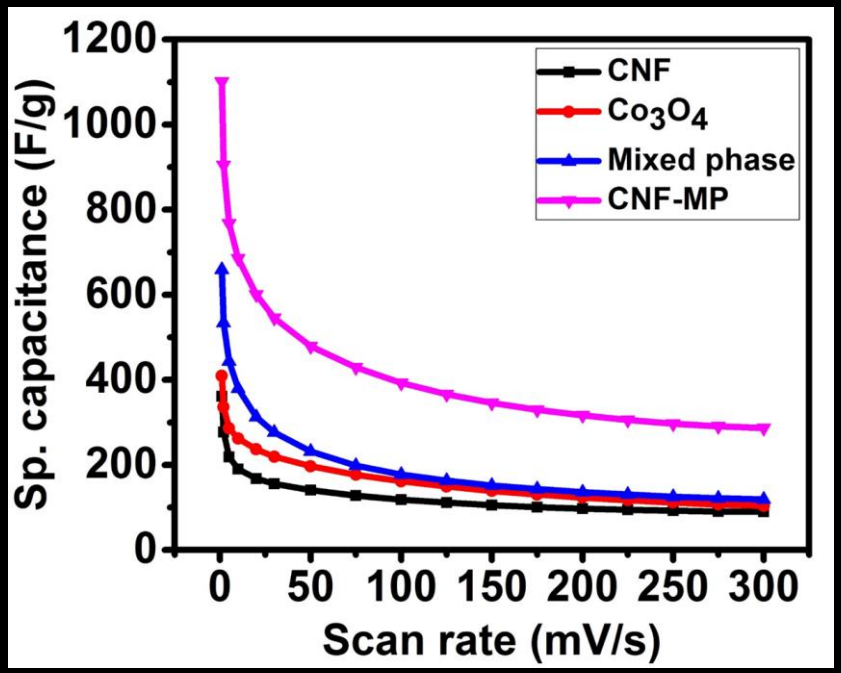


Cyclic voltammetry curves at 50 mV/s

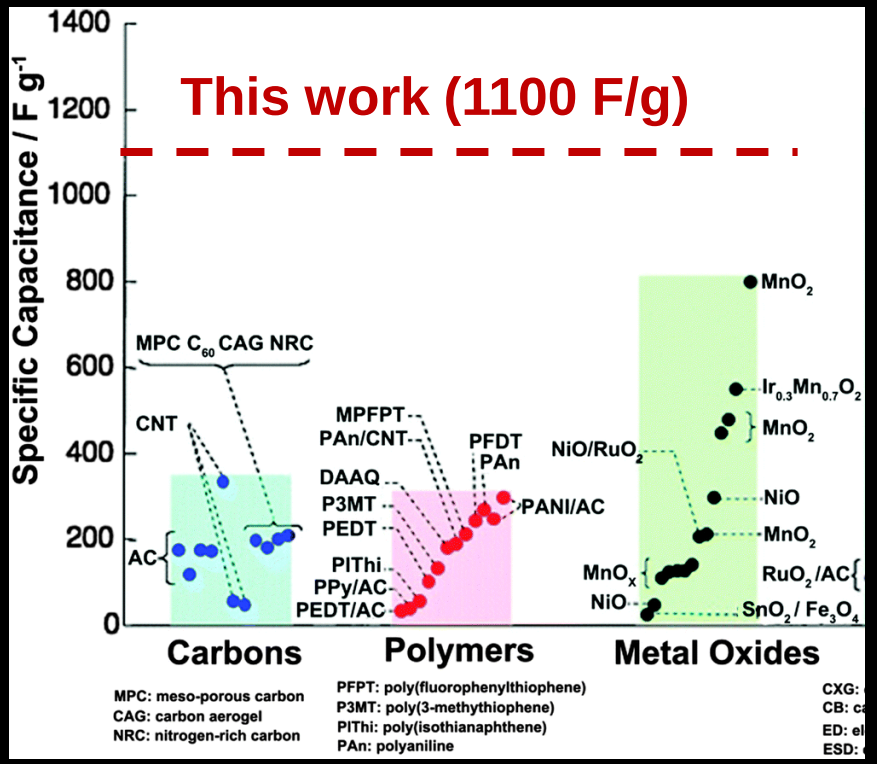


Charge-discharge profiles at 1 A/g

Capacitive performance of cobalt embedded carbon nano fibers



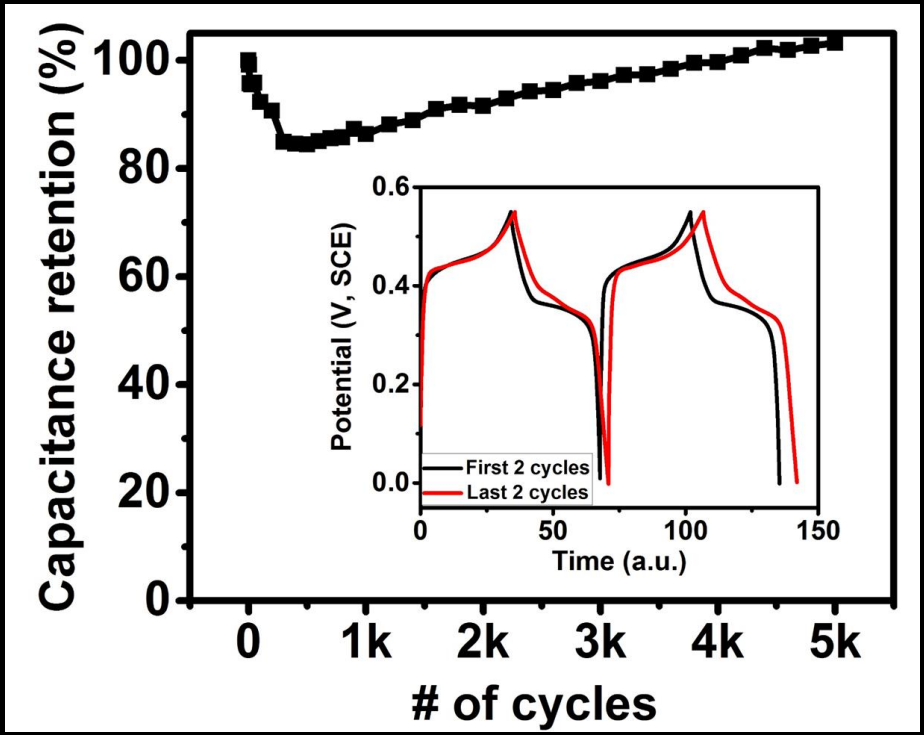
Variation of specific capacitance vs scan rates



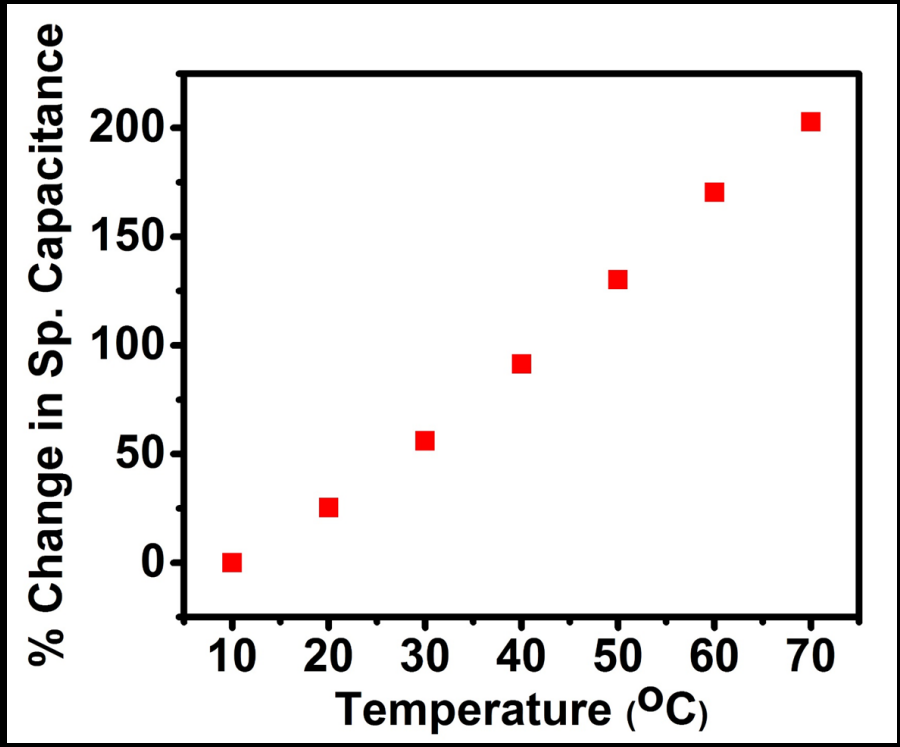
Sp. capacitance of proposed supercapacitor materials in literature

K. Naoi, P. Simon / JES 17.1 (2008) 34-37

Cyclic and temperature stability of cobalt embedded carbon nano fibers

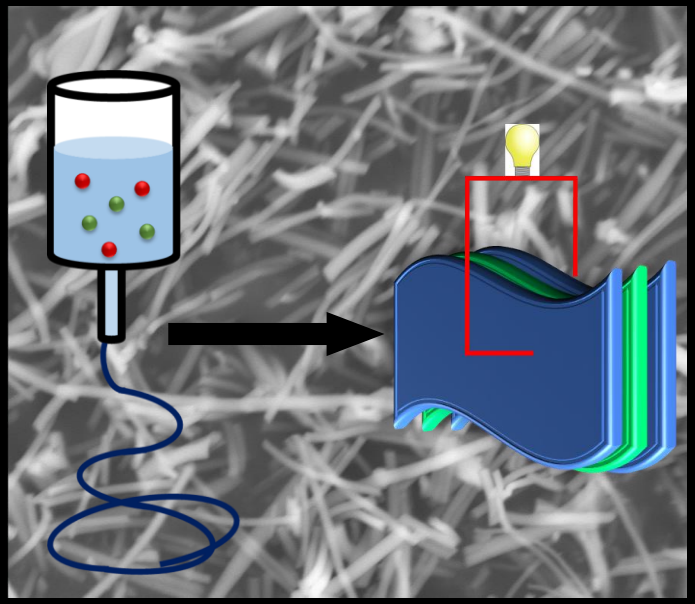


Long term cyclic stability test

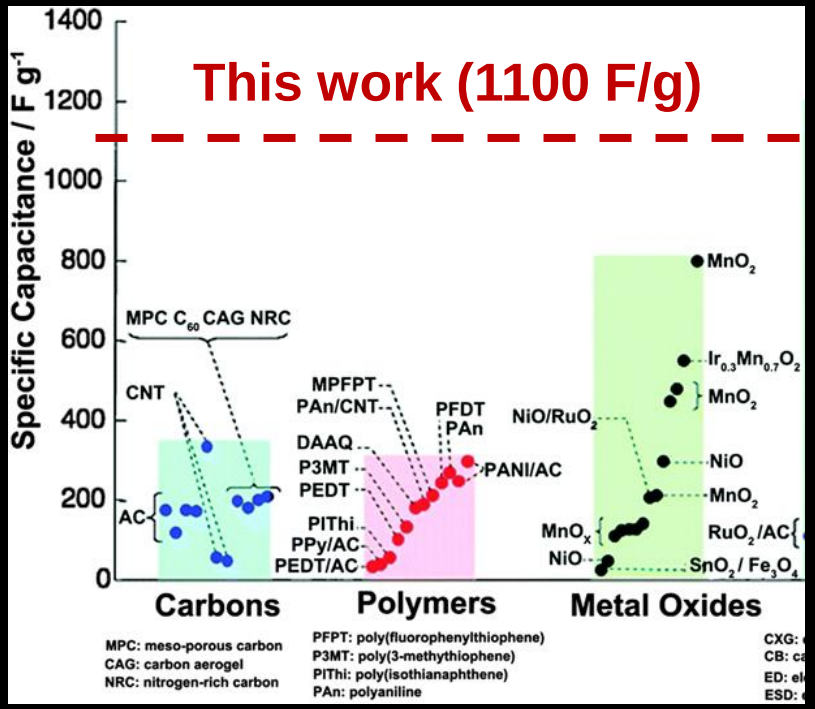


Performance at elevated temperatures

Summary



- Embedding of cobalt oxides to CNF enhance the capacitance of CNF by 3 folds



- Perfect long term life time stability over 5k cycles
- Improved capacitive performance at elevated temperatures

THANK YOU…….

DO YOU HAVE ANY QUESTİONS ?