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Flexible reduced graphene oxide based papers: Fabrication and properties

Tseung Yuen Tseng

National Chiao Tung University, Taiwan

A novel way to synthesize flexible and conductive reduced graphene oxide (rGO) based papers is reported. The multi wall carbon nanotubes (MWCNTs) are added into rGO to make rGO/MWCNTs nanocomposite papers. Their electrochemical performance is investigated in various electrolytes, such as KOH, LiOH, and NaOH. The super capacitive behavior of the papers is examined via cyclic voltammetry, galvanostatic charging-discharging and electrochemical impedance spectroscopy. Their physical properties are characterized by X-ray diffractometer, Raman spectrometer, surface area analyzer, thermogravimetric analysis and field emission scanning electron microscope. The rGO/MWCNTs paper synthesized with suitable amount of MWCNTs exhibits excellent performance in KOH with specific capacitance of 200 Fg⁻¹, energy density of 22.5 Whkg⁻¹ and power density of 115 Wkg⁻¹ at current density 0.25 Ag⁻¹. Such high performance of the paper can be used for making future supercapacitors.

Recent Publications

1. Hung C J, Lin P and Tseng T Y (2013) Electrophoretic fabrication and pseudocapacitive properties of graphene/manganese oxide/carbon nanotube nanocomposites. *Journal Power Sources* 243:594-602.
2. Nyholm L, Nyström G, Mihranyan A and Strømme M (2011) Toward flexible polymer and paper-based energy storage devices. *Advanced Materials* 23(33):3751-3769.
3. Gwon H, Kim H S, Lee K U, Seo D H, Park Y C, Lee Y S, Ahn B T and Kang K (2011) Flexible energy storage devices based on graphene paper. *Energy Environment Science* 4:1277-1283.
4. Rath T and Kundu P P (2015) Reduced graphene oxide paper based nanocomposite materials for flexible supercapacitors. *RSC Advance* 5:26666-26674.
5. Kumar N, Kumar A, Huang G M, Wu W W and Tseng T Y (2018) Facile synthesis of mesoporous NiFe₂O₄/CNTs nanocomposite cathode material for high performance asymmetric pseudocapacitors. *Applied Surface Science* 433:1100-1112.

Biography

Tseung Yuen Tseng is a Lifetime Chair Professor in the National Chiao Tung University. He was the Dean of College of Engineering (2005-2007), the Vice Chancellor of the National Taipei University of Technology, Taipei, Taiwan (2007-2009). He has published over 380 research papers in refereed international journals and invented the base metal multilayer ceramic capacitors, which have become large scale commercial product. He has received Distinguished Research Award from the National Science Council (1995-2001), Academic Award of Ministry of Education (2006), National Endowed Chair Professor (2011), and IEEE CPMT Exceptional Technical Achievement Award (2005) and Outstanding Sustained Technical Contribution Award (2012). He was elected a Fellow of the American Ceramic Society in 1998, IEEE Fellow in 2002 and MRS-T Fellow in 2009.

tseng@cc.nctu.edu.tw