Nanowire capacitors

Can a single nanowire capacitor miniaturize multiple-component devices?
Building entire multiple-component devices on single nanowires is a promising strategyfor miniaturizing electronic applications. Here we demonstrate a single nanowire capacitor with a coaxial asymmetric Cu-Cu 2 O-C structure,fabricated using a two-step chemical reaction and vapour deposition method.

What is the capacitance of a nanowire device?
The capacitance measured from a single nanowire device corresponds to ~140 uF cm -2,exceeding previous reported values for metal-insulator-metal micro-capacitors and is more than one order of magnitude higher than what is predicted by classical electrostatics.

What is the capacitance density of nanowire capacitors?
Remarkable capacitance density as high as 143 uF cm -2is found for such nanowire capacitors,exceeding previously reported values of M-I-M micro/nano-capacitors 2,3,4,5 with capacitance densities ranging from 2.5 to 100 uF cm -2.

How is a metal-insulator-carbon coaxial nanowire capacitor made?
In conclusion,we have demonstrated the synthesis and properties of a metal-insulator-carbon coaxial nanowire capacitor (Cu-Cu 2 O-C) made using a simple two-step chemical reaction and vapour deposition process. The multiple components in the structure were clearly identified by HRTEM,EELS and elemental mapping.

Are carbon fiber supercapacitors based on metal oxide nanowires?
Previous researchers developed multifunctional structural supercapacitors using carbon fiber electrodes . Others have used woven carbon fiber (WCF) sizing with carbon nanotubes and monolithic carbon aerogels ,but WCF supercapacitors based on metal oxide nanowires have yet to be reported.

Why is a coaxial nanowire capacitor more flexible than anodic aluminum oxide templates?
This is due to the frangibility of anodic aluminum oxide templates. Whereas a direct growth of similar structures may be much easier to integrate into flexible substrate, micro/nano-electromechanical system 8, 9, lab-on-a-chip device 10 and so on. Here we demonstrate a single Cu-Cu 2 O-C (metal-insulator-carbon) coaxial nanowire capacitor.

Characterization as a capacitor revealed that the nanowire structure enhances key parameters such as specific capacitance with 60 times greater value than bulk polymer ...

Collateral Advantages of a Gel Electrolyte for MnO2 Nanowire Capacitors: Higher Voltage and Reduced Volume . ??MnO2??????????????????:??????????? ...

Wu, J., Jansson, K., Babadi, A. S., Berg, M., Lind, E., & Wernersson, L.-E. (2016). RF Characterization of

Nanowire capacitors

Vertical Wrap-Gated InAs/High-$kappa $ Nanowire Capacitors.

Collateral Advantages of a Gel Electrolyte for MnO2 Nanowire Capacitors: Higher Voltage; Reduced Volume Mya Le Thai,+ Shaopeng Qiao, ?Rajen K. Dutta, Gaurav Jha,+ Alana Ogata,+ Girija Thesma Chandran, +and Reginald M. Penner*, +Department of Chemistry, University of California, Irvine, CA 92697

Symmetrical, Au@?-MnO 2 nanowire "sandwich" capacitors were prepared by fabricating 1800 nanowire arrays on each of two glass substrates, and pressing these two layers together, using a ?2 um ...

Hybrid sodiumion capacitors (SICs) bridge the gap between the supercapacitors (SCs) and batteries and have huge potential applications in large-scale energy storage. However, designing appropriate anode materials with fast kinetics behavior as well as long cycle life to match with the cathode electrodes remains a crucial challenge. Herein, Nb2O5 nanotubes and nanowire-to ...

1 Fabrication of Capacitors Based on Silicon Nanowire Arrays Generated by Metal-Assisted Wet Chemical Etching By Wen Zheng B.S. Department of Chemistry, Tsinghua University (2010)

Anomalous high capacitance in a coaxial single nanowire capacitor; Self-assembled nanowire array capacitors: capacitance and interface state profile; Modelling and design of high performance capacitors for CPW multi-chip modules; Capacitor balance in a five-level based halfbridge converter by use of a mixed active-cell

Recently we demonstrated that symmetric, all Au@?-MnO2 core@shell nanowire capacitors can achieve cycle stability to 100 000 cycles and beyond in a poly(methyl ...

capacitors A B S T R A C T performance of Si nanowire arrays for capacitor electrodes in ionic liquid [Bmim][NTf 2], is obtainedbyspin-on-doping the nanowires followedbyhot,concentrated nitric acid oxidation. n-and p-type Si nanowire arrays are fabricated via a 2-step metal-assisted chemical etch process to increase the effective surface area.

The second part of the paper describes nanowire synthesis and a novel fabrication process for nanowire-electrode capacitors, and their characterization. Results indicate that nanowires enable a major breakthrough in thinfilm capacitors with ultrahigh volumetric capacitance densities of about 100 uF /mm 3, 10X higher than all current capacitor technologies including trench, ...

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