

Re: Nanotube Ultracapacitors from MIT

Source: <http://sci.tech-archive.net/Archive/sci.energy.hydrogen/2006-10/msg00080.html>

- *From:* "Pluto" <pluto7@xxxxxxxxxxx>
 - *Date:* Sat, 30 Sep 2006 11:23:55 +0800
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Ultracapacitors

Massachusetts Institute of Technology
Laboratory for Electromagnetic and Electronic Systems

Project Title: Carbon Nanotube Enhanced Ultracapacitors (poster)
Investigators: John Kassakian, Joel Schindall, Riccardo Signorelli

Introduction:

Introduction Ultracapacitors or double layer capacitors (DLCs) are energy storage devices whose operation is based on the double layer effect. By utilizing highly porous carbon material with a surface area up to 2000m²/g as electrodes (as in Fig. 3) commercial DLCs can achieve a energy density (6Wh/kg) much greater than the energy density of a conventional capacitor. However, this figure is much lower than the energy density reached by Lithium-Ion batteries (120Wh/kg).

Our analysis shows that the utilization of a matrix of vertically aligned CNTs as electrode structure, can lead to an ultracapacitor characterized by a power density greater than 100kW/kg (three orders of magnitude higher than batteries), a lifetime longer than 300,000 cycles, and an energy density higher than 60Wh/kg.

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MIT researchers introduce nanotech battery

Nanotube ultracapacitors would store energy on atomic level, providing what is said to be the first technologically significant and economically viable alternative to conventional batteries in more than 200 years.

Images of different types of carbon nanotubes. Carbon nanotubes are key to MIT researchers' efforts to improve on an energy storage device called an ultracapacitor.

Source: MIT (enlarge)

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Just about everything that runs on batteries — flashlights, cell phones, electric cars, missile–guidance systems — would be improved with a better energy supply. But traditional batteries haven't progressed far beyond the basic design developed by Alessandro Volta in the 19th century. Until now.

Work at MIT's Laboratory for Electromagnetic and Electronic Systems (LEES) holds out the promise of the first technologically significant and economically viable alternative to conventional batteries in more than 200 years.

Joel E. Schindall, the Bernard Gordon Professor of Electrical Engineering and Computer Science (EECS) and associate director of the Laboratory for Electromagnetic and Electronic Systems; John G. Kassakian, EECS professor