## University of Maryland NSF-MRSEC Highlight:

# Coaxial Nanostructures for Energy Storage

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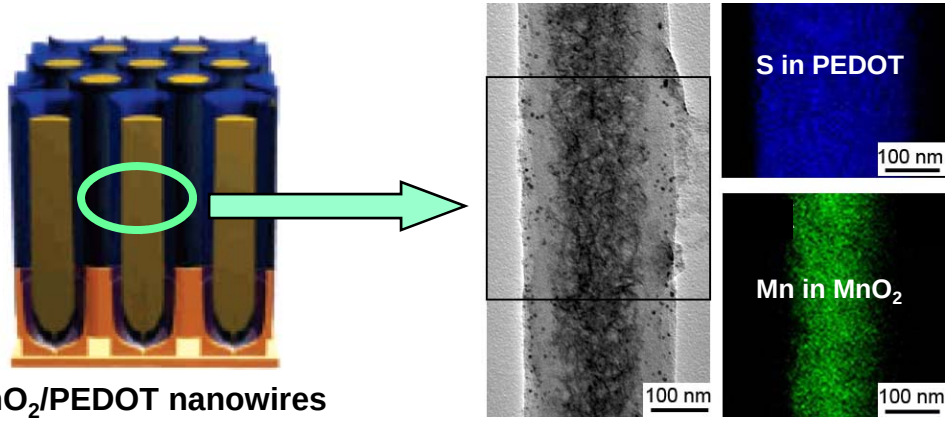
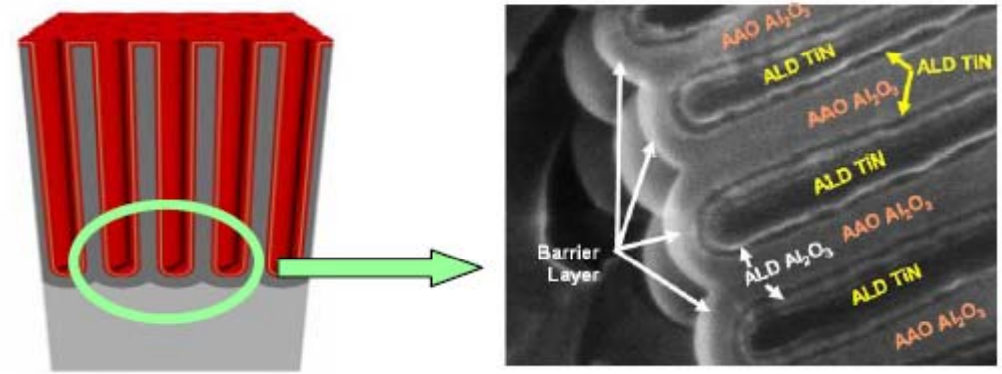
Electrochemical oxidation of aluminum produces very regular arrays of nanopores. UMD-MRSEC researchers are mastering (1) nanopore synthesis and (2) deposition of coaxial multilayers of ultrathin films into the nanopores to create a new generation of devices for storing electrical energy that function as supercapacitors and batteries. These feature simultaneously higher power and higher energy storage than the best of today's devices, meeting the growing need for storing energy derived from new but intermittent sources (solar, wind, etc.). The new nanodevices promise applications from biomedical devices and consumer electronics to automobiles and residential power management.




**$MnO_2$/PEDOT nanowires using electrochemical deposition**




**TiN-Al2O3-TiN capacitor using atomic layer deposition**

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