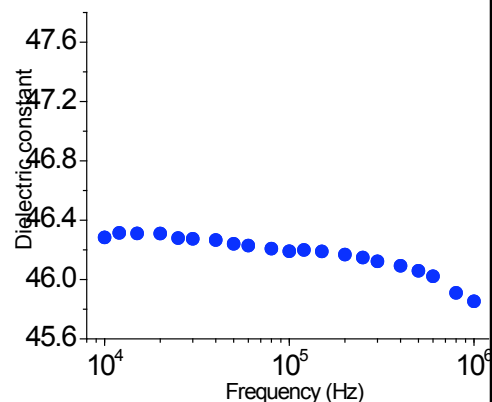
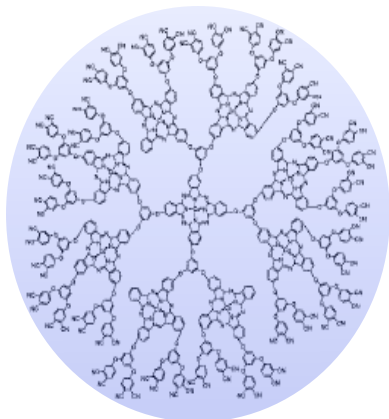


All-organic high energy density capacitor for a brighter energy future



This series of hyper-branched dendritic capacitors replaces old metal or ceramic capacitors with high energy storage capability.

Objective:

- Develop novel approaches to design and fabricate high energy density capacitors.
- Create test facilities to evaluate the performance of high energy density capacitors.
- Create a fabrication facility for the mass production of high energy density capacitors.

Approach

- Explore and Implement the novel design concept of utilizing hyper-branched dendritic structure to achieve high dielectric constant, low dielectric loss and high breakdown voltage.
- Conduct different tests to fully characterize and optimize the capacitor prototype.

Impact:

Our research has developed a series of high dielectric ($K > 45$, $\tan \delta < 0.001$ at 1MHz) hyper-branched copper phthalocyanine materials. This breakthrough will lead to high energy density at the capacitor level, in addition to better compatibility, lower cost and easier to process.

- The high performance capacitor will enable hybrid and electric cars with greater acceleration speed, improved efficiency and reduced cost.
- The research will benefit other energy intensive residential and military applications, such as electronic communication devices.

Contact:

Theodore Goodson III
Chemistry, Macromolecular Engineering
tgoodson@umich.edu
(734) 647 0274
www.umich.edu/~goodgrp/



Facilities and Infrastructure

- Large laser lab and sample fabrication facility.