

Activated Carbon Materials for Electric Double-Layer
Capacitor Applications
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Activated carbon materials have promising performance and economic characteristics that favor their use in ultracapacitor applications including power-assist hybrid vehicles, power quality and other applications. Many recent patent applications and scientific literature have focused on alkali-metal activated carbon materials and sited properties such as edge-plane surface area vs. basal-plane surface area to describe why the alkali metal activation technique is superior to more conventional thermal and chemical activation techniques.

This talk will focus on recently developed activated carbon materials prepared from hardwood – a renewable resource. It will be shown that conventional thermal and chemical activation process can be used to produce activated carbon materials with similar performance when compared to more expensive alkali metal activated carbon materials. Modern pore volume and surface area data based on nitrogen adsorption will be described and correlated to volumetric and gravimetric capacitance, energy capacity, energy efficiency, ESR, and power capacity. Modern interpretations of wide-angle X-ray scattering (WAXS) and small-angle X-ray scattering (SAXS) data will be shown that provides insights into the similarities and differences between activated carbons activated with difference activation techniques.