## YTC America Inc.HIGH ENERGY DENSITY

## **Development of Carbon Nanotube-Based Supercapacitors**

We have developed supercapacitors utilizing electrodes made of binder-free carbon nanotube (CNT) / activated carbon (AC) composites. Due to the absence of organic binder our supercapacitors exhibit a significantly higher volumetric capacitance of ~20 F/cc compared to conventional supercapacitors while maintaining low resistance resulting in smaller package size. Our cells pass 1,000 hour float tests at 2.7V and temperatures between -35°C and 70°C. Flat format >300 F supercapacitor pouch cells have been demonstrated that can be integrated into automotive panels for autonomous power.

Peak Power Demand



Binder free CNT/AC electrodes provide 20% higher energy density than conventional ACbased electrodes

HIGHLIGHTS

Supercapacitors are sources of power for applications such as emergency door lock/unlock, active vehicle stability control, regenerative braking

The flat pouch-cell format allows installation in automotive panels

85 F capacitance as mono-cell,

Discharge time(s)

Time (h)

>300 F for a stacked cell possible

United States Patents US 10,840,032 and US 10,981,794

TECHNICAL DATA		
Typical Cell Values	85 F as mono, > 300 F stacked cell	
Pouch Cell Format	10 cm x 25 cm x 3 mm	
Energy Density(*)	19 Wh/L	
Power Density (*)	12 kW/L	
Max. Operation Voltage	2.7V	
ESR	35 m $\Omega$ at 1 kHz / 42 m $\Omega$ at 0.1 Hz	
Temperature Range	-35 to 70 °C	
Leakage Current	<10 mA after 15 hours	
(*) based on electrode volume		
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