



# Hybrid Supercapacitor and Battery System

Tech ID: 24607 / UC Case 2014-716-0

## BRIEF DESCRIPTION

Researchers at the University of California, Santa Barbara have created a hybrid device that combines the advantages of both batteries and supercapacitors.

## BACKGROUND

Supercapacitors and batteries are the two leading forms of electrochemical energy storage. Both have unique advantages and can be applied to various applications. Supercapacitors can be charged quickly resulting in very high power density and can cycle hundreds of thousands of times with lifetimes measured in decades. However, these devices suffer from low energy density meaning their charge doesn't last as long when compared to a battery. On the other hand, batteries can maintain a longer charge but have a lower power output and lose their ability to retain energy over a lifetime of several years due to material damage. While supercapacitors and batteries have traditionally been viewed as two different options in terms of energy storage, there would be an advantage to combining the two and creating a superior and improved option.

## DESCRIPTION

Researchers at the University of California, Santa Barbara have created a hybrid device that combines the advantages of both batteries and supercapacitors. This device offers high performance in a small package, with 2-3 times the energy density of supercapacitors and 3-4 times the power density of batteries. It has an increased stability and a decreased weight improving the life cycle to about 10-15 years. This technology offers the first supercapacitor/battery hybrid system delivering higher power and a longer lifetime at lower cost.

## ADVANTAGES

- ▶ Battery-level energy density with capacitor-level durability and power density
- ▶ Non-flammable
- ▶ Low-cost, abundant organic materials
- ▶ Aqueous electrolyte with high cell voltage
- ▶ Constant power output (flat voltage plateau)

## APPLICATIONS

- ▶ Renewable grids, grid services, micro grids

## CONTACT

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

cenIEE, batteries, EDLC, energy density, capacitor, indenergy, indadvmat

### CATEGORIZED AS

- ▶ **Energy**
- ▶ Storage/Battery
- ▶ **Materials & Chemicals**
- ▶ Storage

### RELATED CASES

2014-716-0

- ▶ Electric cars/buses, engine start-stop, regenerative braking
- ▶ Electric forklifts, energy recovery, heavy equipment

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,770,699	09/08/2020	2014-716
United States Of America	Issued Patent	9,728,344	08/08/2017	2014-716

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Hemostatic Compositions And Methods Of Use
- ▶ Oxides for Wound Healing and Body Repair
- ▶ Mesocellular Oxide Foams as Hemostatic Compositions and Methods of Use

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