

EFFECTIVE ENERGY STORAGE DEVICES

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Анотація:

В статті розглядаються ефективні та безпечніші накопичувачі енергії.

Ключові слова:

суперконденсатор, акумуляторна батарея, енергія.

Abstract:

The article considers efficient and safer energy storage.

Key words:

supercapacitor rechargeable battery, power.

There is a paradoxical situation in the world. Electricity is the only commodity that mankind has not learned to save cheaply. To help them, scientists have developed rechargeable batteries. However, everything is developing and replacing the lead-acid rechargeable batteries became super-capacitors.

A supercapacitor is a device capable of storing and delivering electricity. Unlike accumulators that "work" with electrochemical reactions, they "work" with the surface of the electrode. Therefore, the first is much more energy-intensive, but the second one is much more powerful and faster. The super-capacitors charge very quickly and for a fraction of a second they are capable of releasing a high-power charge. For the first time these devices appeared in the late 1970's. But since then, they have become much stronger. [1]

Now manufacturers use nonporous coal in them, the surface of which reaches 1 500-2 000 m² per gram of material, that is, almost half of the football field in one gram. Capacities of large supercapacitors are already calculated by thousands of farads, although the word "large" here refers more to the capacity than to the mass, - 3000 farads fit into a capacitor weighing 0.5 kg.

Consequently, super-capacitors are used where high peak loads are required. For example, it is in electric welding, where there is a current up to several thousand amperes. Or in wind power plants, in order to quickly change the angle of the blade – otherwise a strong gust of wind can break the screw.

In super-capacitors there are other advantages over batteries. They can work in a wide temperature range: they are not afraid of heat and at -40 ° C they will drive any diesel engine. And they are capable of similar many times – these devices guarantee millions of cycles "charge-discharge".

And because of this high trickiness supercapacitors are great where you need to constantly charge something-discharged. For example, in hybrid cars in systems "stop-start" or in regenerative braking, when released kinetic energy is converted into electrical and stored for further use.

And yet, these devices are safe: do not overheat and do not deal with how often sinned lithium-ion batteries.

Hybrid capacitors combine components and, respectively, properties of super-capacitors and accumulators. They have more energy, and they can produce high power, though somewhat smaller than super-capacitors. But they charge them in 2-3 minutes, and on energy intensity can be compared with batteries. [2]

Also, a supercapacitor accumulator on the average of 16 elements 3.2V/16Ah is already on offer.

СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

1. Найкращий накопичувач енергії [Електронний ресурс]. – Режим доступу : <https://www.epravda.com.ua/publications/2018/04/23/636238/>

2. Графеновий суперконденсатор [Електронний ресурс]. – Режим доступу : <https://scorcher.ru/journal/art/art2359.php>

3. Українські суперконденсатори [Електронний ресурс]. – Режим доступу : <https://innovationhouse.org.ua/ru/statti/sekret-yunasko-vse-delo-v-dyzajne-systemy/>

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