

## Lithium-ion ultracapacitor could recharge power tools in minutes

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Ioxus' product line of hybrid lithium-ion ultracapacitors. Image credit: Ioxus.

(PhysOrg.com) -- Although many people keep a few power tools in the garage or basement for weekend projects, the tools usually don't get used very often. Fully recharging the battery in a drill or saw can take several hours, even if the tool is only used for a few minutes. But with a hybrid energy-storage device that combines a lithium-ion battery with an ultracapacitor, power tools could be recharged in about one minute and have a lifetime of more than 20,000 charges. The downside is that the power tool could run for only about 1/15 as long as it would on a normal battery.

The new lithium-ion ultracapacitor was developed by Ioxus, a company based in Oneonta, New York. The company specializes in making ultracapacitors for hybrid-electric buses and engine start-stop systems in



fuel-efficient cars.

In general, hybrid lithium-ion ultracapacitors are similar to traditional lithium-ion batteries, except that they store charge at the surface of the electrodes instead of within the electrodes. Although the concept of hybrid lithium-ion ultracapacitors has been around for 20 years, demand for alternative energy-storage devices has inspired recent improvements.

Typically, standard ultracapacitors can store only about 5% as much energy as lithium-ion batteries. Ioxus' new hybrid system can store about twice as much as standard ultracapacitors, although this is still much less than standard lithium-ion batteries. However, the advantage of ultracapacitors is that they can capture and release energy in seconds, providing a much faster recharge time compared with lithium-ion batteries. In addition, traditional lithium-ion batteries can be recharged only a few hundred times, which is much less than the 20,000 cycles provided by the hybrid system. In other words, the hybrid lithium-ion ultracapacitors have more power than lithium-ion batteries, but less energy storage.

In the future, the hybrid lithium-ion ultracapacitor could also be used for regenerative braking in vehicles, especially if it could be scaled up to provide greater energy storage. Since vehicle braking systems need to be recharged hundreds of thousands of times, the hybrid system's cycle life will also need to be improved.

More information: <u>loxus</u>

via: Technology Review

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