Panasonic develops bendable, twistable, flexible lithium-ion battery

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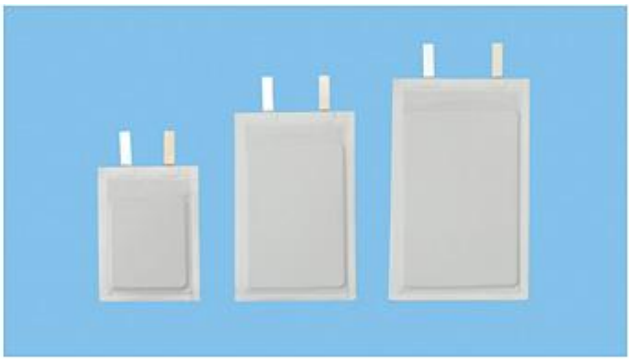
Flexible Lithium-ion Battery (CG-064065)



Flexible Lithium-ion Battery
(From the left, CG-062939, CG-063555, CG-064065)

Credit: Panasonic Corporation

Panasonic Corporation announced today that it has developed a Flexible Lithium-ion Battery with a thickness of only 0.55mm, or about 0.022 inches. Suitable for use in card-type and wearable devices, this rechargeable battery can retain its characteristics even after repeatedly bent into a radius of 25mm or twisted to an angle of 25 degrees.

Card devices, which are often carried in wallets or pockets, require internal components that can withstand bending and twisting. Slim lithium-ion batteries are used in such devices, but these batteries can degrade when they are bent or twisted, resulting in shorter operating time

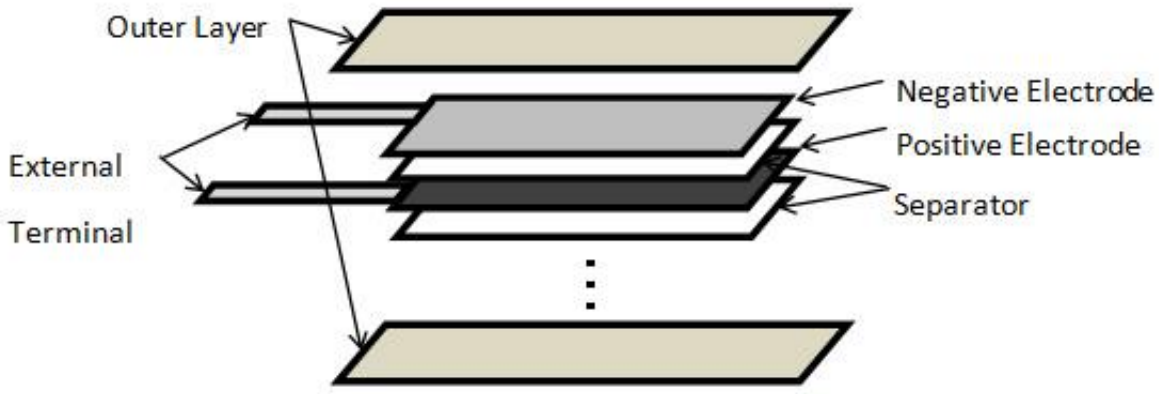
for the devices.

Panasonic's new flexible battery can withstand bending and twisting beyond the Japanese Industrial Standards for identification cards. When used in card devices such as smart cards and card keys that work on batteries, as well as body worn devices and smart clothing, this battery can retain its characteristics even if the device is frequently bent or twisted.

This new flexible battery will be on display at CEATEC JAPAN 2016 from October 4 to 7 at Makuhari Messe.

Panasonic's Flexible Lithium-ion Battery has the following features:

1. The battery can maintain its characteristic even with repeated bending and twisting.
2. The battery contributes to longer life of devices as it retains charging and discharging characteristics even with repeated bending and twisting.
3. The battery can be used reliably for devices attached to the human body because of excellent safety.



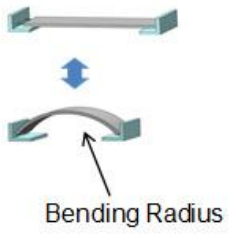
Credit: Panasonic Corporation

Suitable applications:

Card devices, devices attached to the human body, smart clothing, wristband wearable devices, etc.

Sample availability:

Sample shipments are scheduled to start by the end of October 2016. Product development will continue towards mass production, with an eye to an even slimmer form factor ideal for various IoT devices such as card devices and wearable devices.



Bending radius	No bending	R40mm (common requirement of card standards)	R30mm	R25mm
Capacity retention	100%	99%	99%	99%

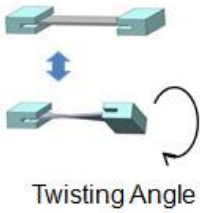
Bending Test Results (1,000 times bending). Credit: Panasonic Corporation

Features

1. A flexible battery that can maintain its characteristic even with repeated bending and twisting.

Panasonic has developed a Flexible Lithium-ion Battery with a thickness of 0.55mm that uses the company's unique stacked electrode construction that has resistance to bending and twisting. The battery has demonstrated that it retains its characteristics during bending and twisting tests with severer conditions required by card application standards. This battery can maintain more than 99% of its initial capacity after 1,000 bends with a radius of 25mm, or after twisted 1,000 times with an angle ±25°/100mm, thanks to a newly developed laminated outer layer and newly developed internal structure. This battery can meet various market needs for applications entailing repeated bending and twisting such as card devices and smart clothing.

2. Contributing to longer life of devices by retaining charging and discharging characteristics even with repeated bending and twisting.



Twisting angle	No twisting	±15° (common requirement of card standards)	±20°	±25°
Capacity retention	100%	100%	99%	99%

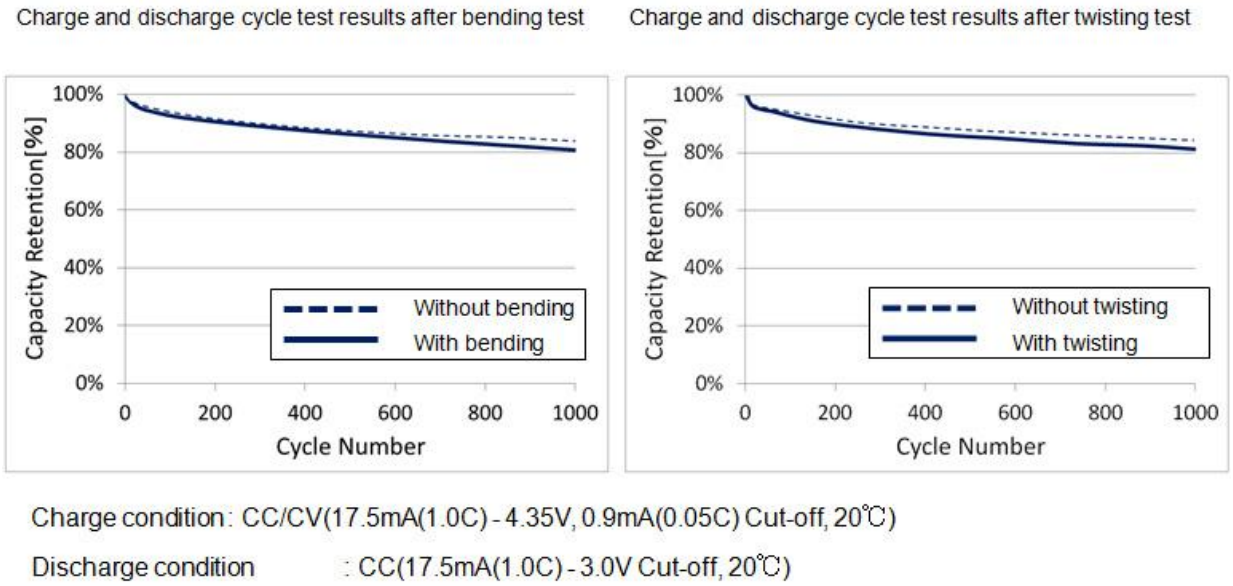
Twisting Test Results (1,000 times twisting). Credit: Panasonic Corporation

Current lithium-ion batteries such as prismatic or pouch battery are neither bendable nor twistable. Repeated bending of a rechargeable battery can cause a big impact on the charge and discharge cycle and life of a battery. The new battery has shown 80% initial capacity retention based on the company's unique testing of 1,000 times of charge and

discharge cycle following either 1,000 times of bending or 1,000 times of twisting. This battery can contribute to longer operating time of card devices, wearables and other devices by reducing the battery deterioration due to bending and twisting as well as the charge and discharge cycle.

3. The new battery can be used reliably for devices attached to the human body because of excellent safety.

This battery uses newly-developed laminated outer body and internal structure that make it difficult to cause leakage and abnormal heating during repeated bending and twisting. That makes this battery reliable and safe for use in wearable and body attached devices.



Charge condition : CC/CV(17.5mA(1.0C) - 4.35V, 0.9mA(0.05C) Cut-off, 20℃)

Discharge condition : CC(17.5mA(1.0C) - 3.0V Cut-off, 20℃)

Credit: Panasonic Corporation

Product Name	Flexible Lithium-ion Battery		
Part number	CG-062939	CG-063555	CG-064065
Size (Max.) *5	28.5mm x 39.0mm	35.0mm x 55.0mm	40.0mm x 65.0mm
Weight	Approx 0.7g	Approx 1.4g	Approx 1.9g
Thickness (Max.)	0.55mm		
Nominal Capacity	17.5mAh	40mAh	60mAh
Nominal Voltage	3.8V		
Maximum Charging Voltage	4.35V		
Maximum Charging Voltage	17.5mA (1C)	40mA (1C)	60mA (1C)
Bending Radius (Max.) *6	R25mm		
Bending Radius (Max.) *6	±25°/100mm		

Provided by Panasonic Corporation