

INDIAN, KOREAN RESEARCHERS DEVELOP LIGHT-POWERED SUPERCAPACITORS

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June 09, 2023 07:22 pm | Updated June 10, 2023 03:06 am IST - THIRUVANANTHAPURAM

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A graphical representation of light-powered supercapacitors. | Photo Credit: Special Arrangement

A group of researchers has developed a portable supercapacitor that can be charged using light in a collaborative project involving institutions in India and South Korea.

The invention holds promise for replacing the conventional lithium-ion batteries in portable and wearable devices such as smartphones, tablets, laptops and smartwatches.

The study, which has been published in peer-reviewed journal *Journal of Power Sources*, was undertaken by researchers from University College, Thiruvananthapuram; IIT Guwahati; Gwangju Institute of Science and Technology; Korea Institute of Energy Technology; and Chonnam National University in South Korea.

The lead author Rani J.R., an Assistant Professor of Physics at Government Women's Polytechnic at Kaimanam, points out that supercapacitors are an alternative charge storage device which can store electric charge similar to traditional batteries.

However, supercapacitors' capability of getting charged and discharged quickly makes them ideal for applications requiring short power bursts such as wearable devices and electric vehicles. Besides, they exhibit long life since they are not subject to chemical degradation as in conventional batteries.

A supercapacitor device consists of an electrode, electrolyte and a current collector. The researchers developed a design involving a stainless steel electrode with a quartz transparent window in order to harvest visible light. A specially prepared 'down-conversion' phosphor is introduced before the quartz window to facilitate light-induced charging.

"Devices that are powered by such supercapacitors can be charged by simply keeping them under light and can be powered even when we are on the move for days or weeks. In the case of electric vehicles, supercapacitors can provide short-term boosts that will enable them to accelerate faster and climb hilly terrain with considerable ease. Such light-powered applications can also be used in space applications and satellites by powering remote sensors and providing back-up power during power outages," said Dr. Rani.

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