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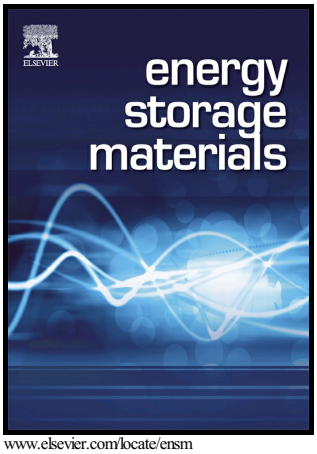

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Flexible Supercapacitors: Tuning with Dimensions

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Flexible Supercapacitors: Tuning with Dimensions

Unlike batteries, supercapacitors have the unique features of fast charge-discharge and moderate capacity, accompanied by simplicity in configuration (especially for symmetric supercapacitors), the ability to use safe aqueous electrolytes, and long cycle life. These characteristics make them particularly suitable for circumstances where the rate performance is a priority to capacity. In order to increase their capacity, extensive efforts have been conducted to extend their application, and many reviews on this topic have recently been published. Apart from this, there has been increased effort on making supercapacitors more suitable for future applications: smart, micro-sized, integrated, wearable, *etc*.[1] One of the key characteristics that determines these applications is the flexibility (*i.e.* the ability to maintain performance under different types of deformation), which makes them bendable, stretchable, weaveable, and ready to be incorporated into flexible or wearable devices. Because of this, in this issue of ***On Energy*** we shall discuss the flexibility of supercapacitors.

Since the packaging materials and separators of supercapacitors can be easily made from flexible materials (normally polymers), the key factor in producing a flexible supercapacitor remains its electrode materials, or more specifically, active materials. In a conventional supercapacitor, the active materials are usually in powder form and are coated onto metal foil current collectors to be used as electrodes. In spite of the fact that these electrodes can be bent to a certain extent, they are normally assembled into a pouch or cylindrical cell and cannot be practically used as part of a flexible supercapacitor. To produce a flexible supercapacitor, the electrode must be able to withstand a large number of cycles of bending and/or stretching without irreversible deformation or detachment of the active materials.

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