**Micro-architecture of electrodes for deformable energy storage devices**

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Abstract

Continuous novelty as the basis for creative advance in rapidly developing different form-factor microelectronic devices requires seamless integrability of energy storage devices (ex, Li-ion batteries and supercapacitors). The electronic components of the soft and free-form devices have been surprisingly advanced. For example, the applications of the novel electronics are broadening rapidly, such as wearable electronics, smart clothes, electronic skins, AI, and implantable medical devices. However, there is one component that has harshly changed to the new-type, energy storage devices. In other words, the energy storage devices are a limiting factor in achieving complete and independent smart electronics for the next generation. Fortunately, along with developments in energy storage materials, the focus has been shifting more and more towards innovative fabrication processes, unconventional configurations, and designs with multi-functional components very recently. To overcome the challenge, two common strategies are adopted; 1) materials that have intrinsic deformable feature and 2) free-form designs that are able to operate under mechanical strain. Here, we summarize the latest strategies for free-formed and deformable energy storage devices as a final racer to the next-generation of smart electronics. The proposed concept is not exclusive for freely deformable energy storage devices for conventional devices but also gives rise to a multi-disciplinary range of applications from smart vehicles to soft robotics and human implantable devices for the next generation.