

A Platform of 3D Printed Devices to Power Wearable Sensors

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Abstract

3D-printing a sustainable manufacturing technique with applications in different industries, from automotive to aerospace, medicine, and energy.

At small scale, 3D printing can enable the fabrication of miniaturized electrodes with free form factors and high mass loading over small footprint areas. 2D materials with outstanding electrochemical properties are suitable to serve in energy conversion and storage devices.

In this talk, I will present our work on 3D printed miniaturized electrodes in the form of supercapacitors and rechargeable batteries beyond lithium. We use earth-abundant electrode materials and water-based electrolytes or gel electrolytes to manufacture energy storage devices to meet the growing energy demand to power wearable and portable electronic devices.

I will discuss the materials challenges in formulating inks of nanomaterials and different architectural design to optimize the electrochemical performance. I will then show how these devices can power wearable sensors.