Current collector-free printed three-dimensional MXene-based anodes for lithium-ion batteries

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This paper aimed to reveal the dual functional properties of MXene as an active and conductive material for lithium-ion batteries, reducing weight, and eliminating the need for separate current collector which reduces the cost of battery manufacturing. A two-dimensional (2D) MXene with exceptional conductivity and feasibility for lithium-ion intercalation were utilized to fabricate a three-dimensional (3D) current collector-free anode for lithium-ion batteries. The process was simple and scalable, achieved through 3D printing technique. The performance of the 3D MXene-based anodes was carefully analyzed in terms of their electrochemical properties, including capacity, cycling stability, and rate capability, and the results were outstanding, indicating that this approach has potential to produce high performance batteries. These findings have significant implications for the development and manufacturing of advanced energy storage devices.

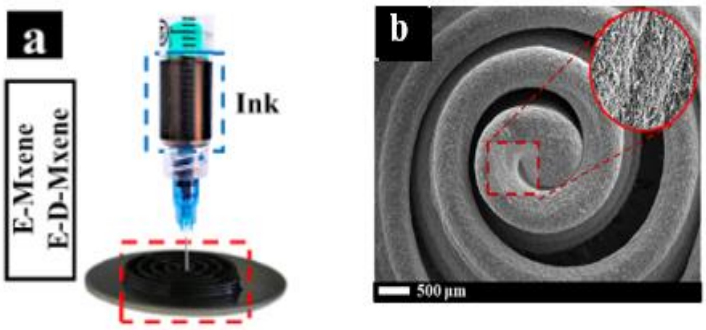

Figure 1. Illustration of 3D MXene ink printed electrodes with different layers.

Keywords: Lithium-ion battery, printed 3D-MXene

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