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Electronic Supplementary Information for

3D Printed Graphene/Nickel Electrodes for High Areal Capacitance Electrochemical Storage

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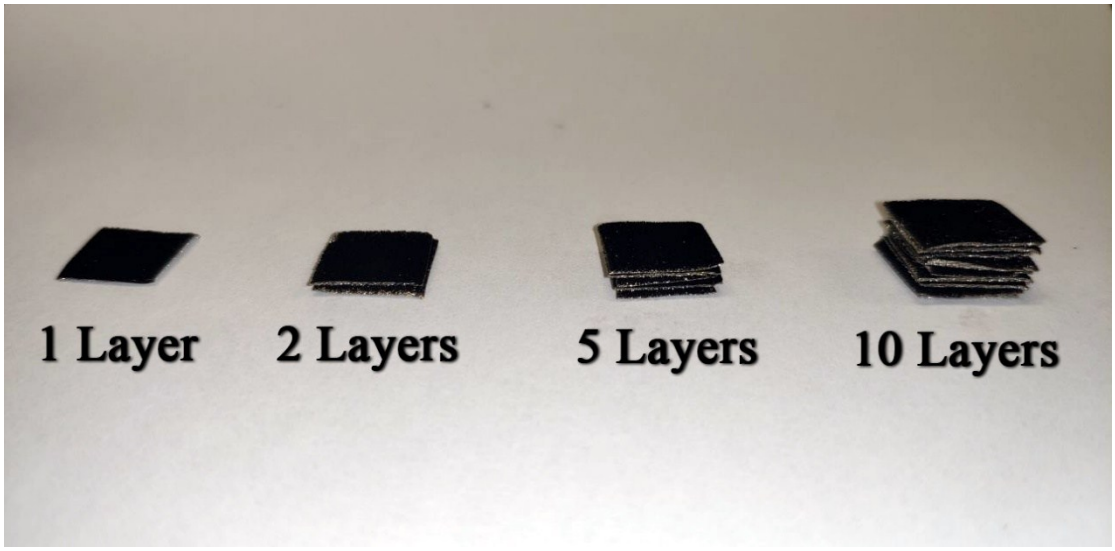

Figure S1 As-printed graphene/nickel foam with different layers of printing.

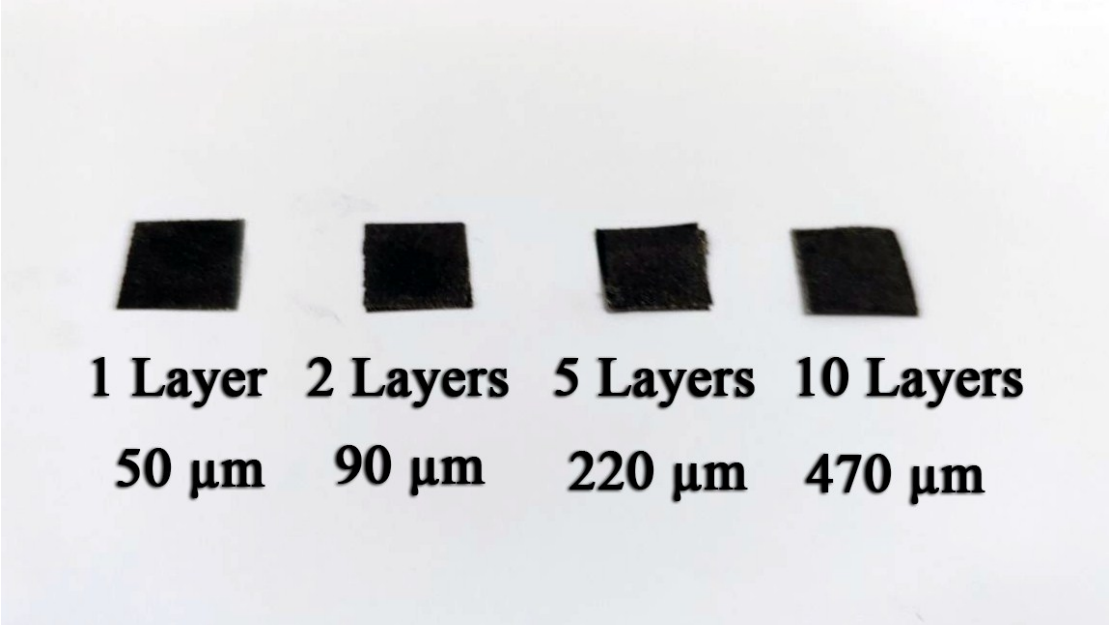

Figure S2 LIFT printed graphene/nickel foam with different layers of printing after mechanical pressing and their corresponding thicknesses.

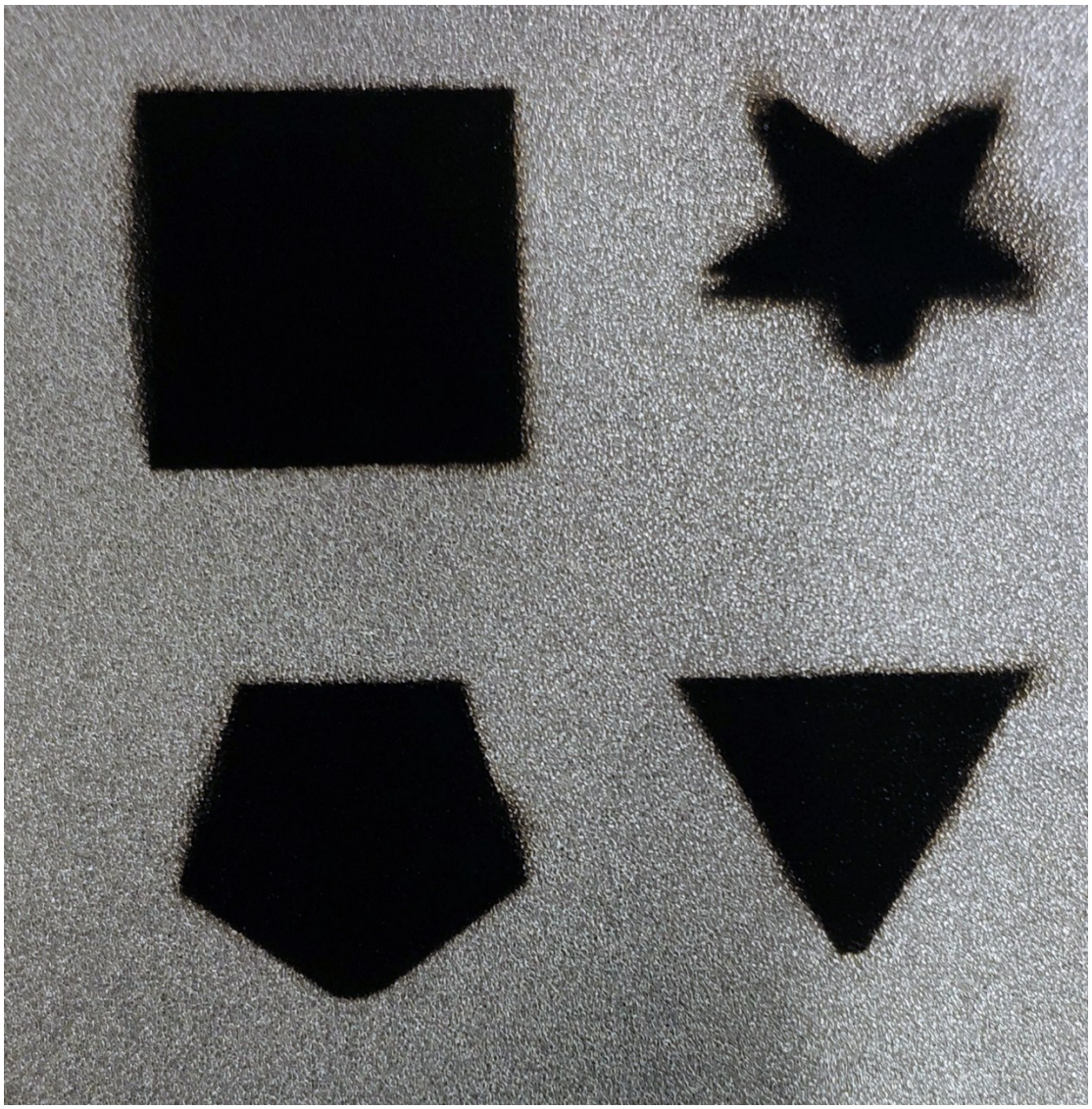

Figure S3 Optical image of LIFT printed arbitrary shape of patterns for graphene on nickel foam.

Figure S4 Assembled 3D printed graphene/nickel supercapacitor in punch cell style, with size comparing to an iPhone 7.

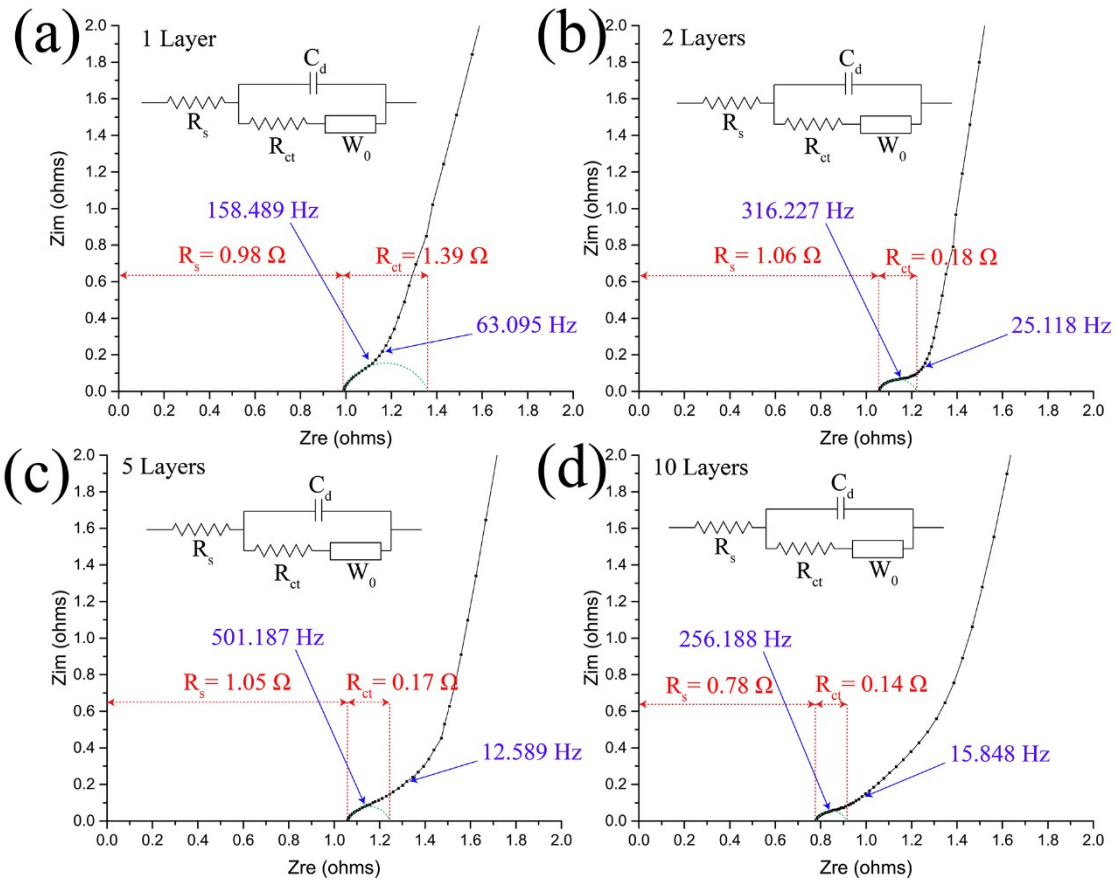

Figure S5 ESR analysis of LIFT printed graphene/nickel electrode with different numbers of printing.

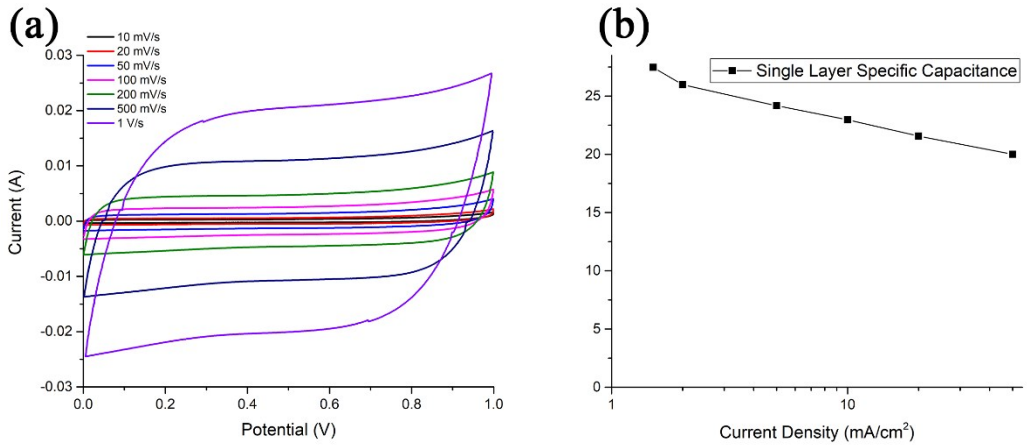

Figure S6. (a) CV of single layer LIFT printed graphene/nickel electrode measured using three-electrode configuration with Ag/AgCl reference electrode. (b) Specific capacitance of single layer LIFT printed graphene/nickel electrode with three-electrode configuration.

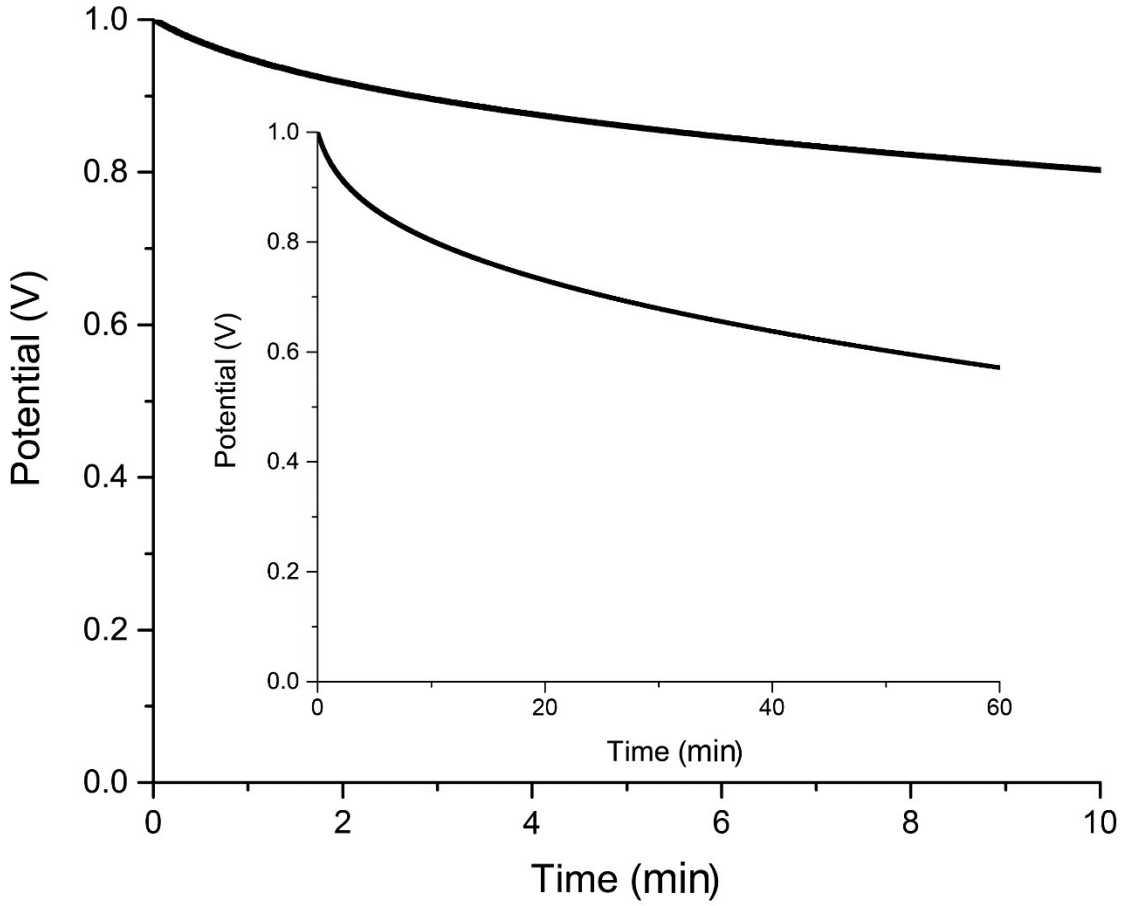

Figure S7 Self-discharge behavior of the 3D printed graphene/nickel electrodes.

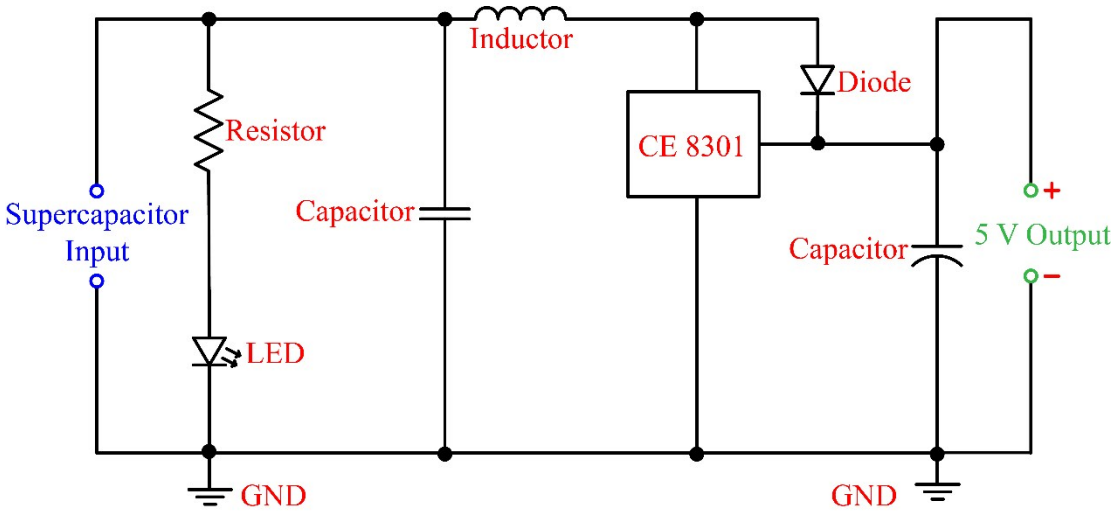

Figure S8 Circuit for DC-DC step-up converter with constant 5 V output.

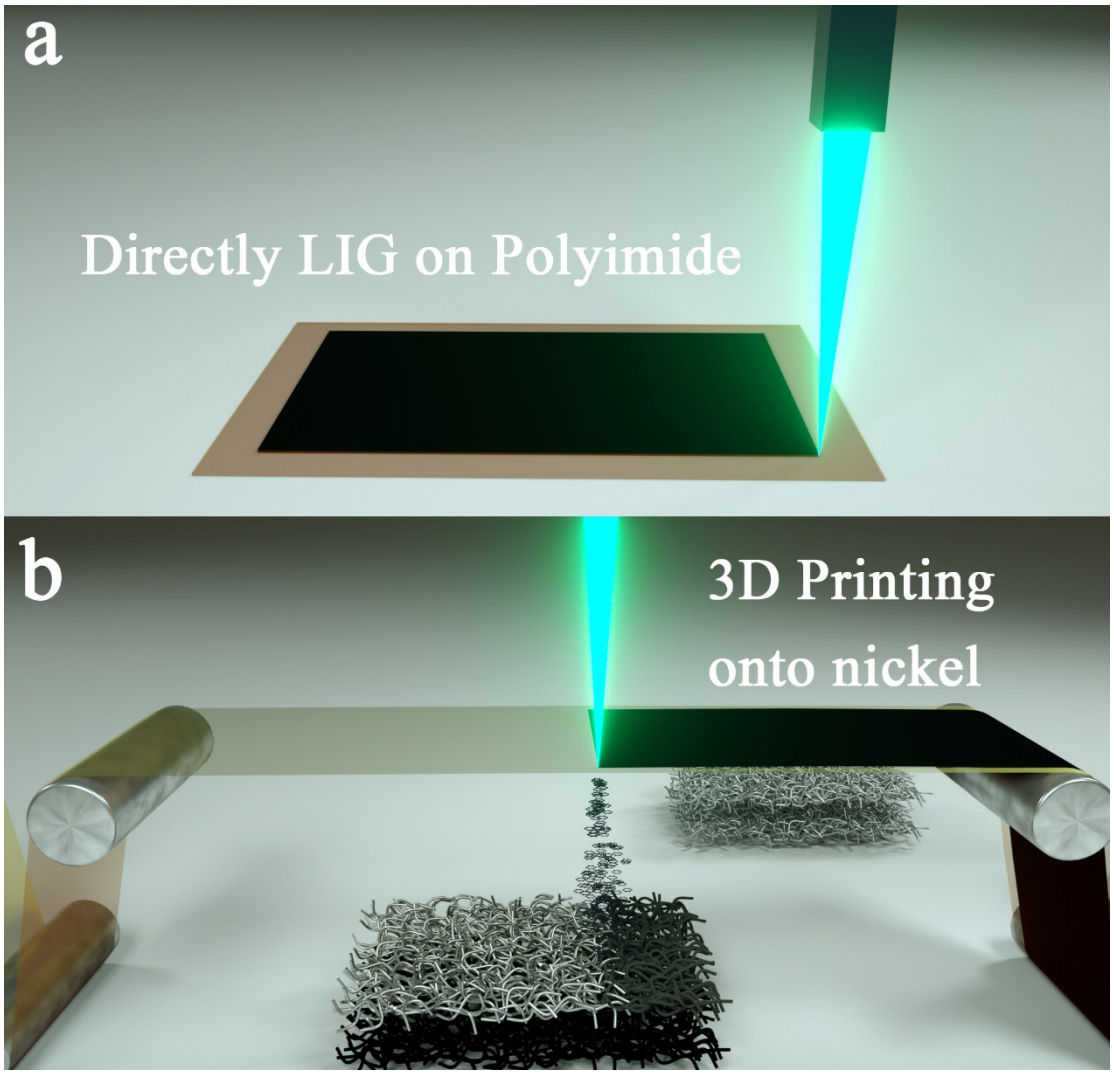

Figure S9 Comparison of the directly laser induced graphene formation on graphene (a), and this novel LIFT based 3D printing of graphene onto nickel foam current collector (b).