

## All-solid-state Flexible Supercapacitors Based on Screen-printed Graphene Electrodes

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Graphene ink was produced using graphene, polyvinylidene fluoride, and acetylene black with 1-methyl-2-pyrrolidinone in a ball mill and the thickness and viscosity of the ink were characterized. Afterwards, the conductive silver ink was screen printed and thermally cured onto a poly(ethylene terephthalate) substrate. In addition, the prepared graphene ink was screen-printed onto the conductive silver layer and dried to create a flexible supercapacitor electrode. A PVA-H<sub>2</sub>SO<sub>4</sub> gel was coated onto the flexible electrode as electrolyte. Finally, a symmetric supercapacitor was successfully assembled and shows a specific capacitance of 190.6 F g<sup>-1</sup> at 0.5 A g<sup>-1</sup> and a maximum energy density of 16.94 W h kg<sup>-1</sup>. The three devices connected in series to light up a light-emitting diode. The printed flexible electrodes created using a simple process could play an important role in the energy storage field.

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**Keywords:** graphene; all-solid-state; flexible supercapacitors; printed electronics

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