Defocused Laser Flexible Capacitor

Can a laser be used to produce electrodes of supercapacitors?
Lasers with various combinations of pulse widths and wavelengths may be similarly applicablefor producing electrodes of supercapacitors from different kinds of polymers. Depending on these parameters,the beam scanning speed,laser power and number of pulses may be optimized to increase the process throughput.

Can femtosecond lasers be used to make micro-supercapacitors?
Our results present facile fabrication of on-chip micro-supercapacitors that is free of deposition of carbon nanomaterials and photolithographic micro-patterning. We finally comment that our methodology is not limited to use of femtosecond lasers.

Can laser-induced carbonization be used to make flexible micro-supercapacitors?
Furthermore,a focused laser beam can localize the area of carbonization,opening up a new route to achieving direct writing of carbon micro-patterns on polymeric sheets by laser beam scanning. In this report,we introduce the laser-induced carbonization technique for facile fabrication of flexible micro-supercapacitors.

What are flexible supercapacitors?
Evidently,flexible supercapacitors offer a unique combination of conformability and durability,leading to withstand lengthy charge-discharge cycles even at higher temperatures. [11 - 13]Based on the charge storage,there are two distinct subtypes of supercapacitors: 1) electrochemical double-layer capacitors (EDLCs) and 2) pseudo-capacitors.

Can a laser beam be used to create micro-supercapacitor electrodes?
Combined with the carbonization process,these porous carbon structures can be a good candidate for micro-supercapacitor electrodes. Furthermore,a focused laser beam can localize the area of carbonization,opening up a new route to achieving direct writing of carbon micro-patterns on polymeric sheets by laser beam scanning.

Can micro-supercapacitors be used for flexible devices?
The CV response reveals only a moderate degree of change in capacitive characteristics by bending,which is comparable to that of carbon nanotube array-based flexible micro-supercapacitors . This promising mechanical performance of our all solid-state micro-supercapacitors suggests their potential use for flexible devices.

Complex engineering scenes increase the difficulty of camera calibration. High precision and easy operation are the necessary conditions to ensure successful calibration. This paper proposes a flexible calibration method for defocused cameras. Firstly, the initial calibration is completed by traditional Zhang"s method. Then, the linear camera calibration based on the image pair is ...

Based on laser direct writing technology, FMSCs could be formed into capacitor arrays and continuously

supply energy to flexible sensors, while FMSCs as flexible energy storage devices could continuously collect energy to charge FMSCs by integrating flexible energy harvesters (such as flexible solar cells and TENG), in this way constituting a self-powered ...

We report a high-frequency flexible symmetrical supercapacitor composed of a MnO2@carbon cloth hybrid electrode (CC@MnO2), which is synthesized by the defocused-laser ablation ...

Ultrahigh-Areal Capacitance Flexible Supercapacitors Based on Laser Assisted Construction of Hierarchical Aligned Carbon Nanotubes. Shan Huang, Shan Huang. Xi"an Key Laboratory of Sustainable Energy Materials ...

We demonstrate the fabrication of flexible micro-supercapacitors based on laser carbonization of polyimide sheets. Localized pulsed laser irradiation rapidly converts the ...

We report a high-frequency flexible symmetrical supercapacitor composed of a MnO 2 @carbon cloth hybrid electrode (CC@MnO 2), which is synthesized by the defocused ...

This paper presents a flexible high-voltage microsupercapacitor (MSC) with a planar in-series architecture for the first time based on laser-induced graphene. The high-voltage devices are capable of supplying output voltages ranging from a few to thousands of volts. The measured capacitances for the 1, 3, and 6 V MSCs were 60.5, 20.7 ...

Electrochemical capacitors, or named as supercapacitors (SCs), ... A direct laser reduces the graphite oxide (GO) to laser-scribed graphene (LSG) films, which are mechanically robust, show high electrical conductivity (1738 S/m) and high specific surface area (1520 m 2 /g) [62]. In order to evaluate the performance of the all-solid-state LSG-SC for flexible energy ...

OPTICS AND LASERS IN ENGINEERING ? 157, ? -, ?? - ???. ELSEVIER SCI LTD DOI: 10.1016/j.optlaseng.2022.107125 ... This paper proposes a flexible calibration method for defocused cameras in complex engineering scenes. The method achieves high calibration accuracy by solving the distortion coefficient and establishing an image distance conversion ...

BaTiO 3 (BTO) ferroelectric films, which are renowned for their lead-free compositions, superior stability, and absence of a wake-up effect, are promising candidate materials in the field of non-volatile memories. However, the prerequisites for high-temperature conditions in the fabrication of ferroelectric thin films impose constraints on the substrate choice, which has limited the ...

A CO 2 laser beam instantly transforms the irradiated polyethersulfone polymer (PES) into a highly porous carbon structure. The LIG method was used to deposit graphene layers on graphite sheets to produce the supercapacitor electrodes. Graphene formation and morphology were examined and confirmed using several techniques including Scanning Electron Microscopy ...

Defocused Laser Flexible Capacitor

Flexible supercapacitors with hybrid anodes have gained significant attention in energy storage research, owing to their remarkable specific capacitance, outstanding power ...

We report a high-frequency flexible symmetrical supercapacitor composed of a MnO2@carbon cloth hybrid electrode (CC@MnO2), which is synthesized by the defocused-laser ablation method. This CC@MnO2-based symmetric supercapacitor has an excellent specific areal capacitance of 1.53 mF cmâ^"2 at a frequency of 120 Hz and has good ...

A dual defocused laser pyrolysis technique is proposed to optimize for defects and morphology of laser-induced graphene electrodes. Flexible and self-healable ...

We demonstrate the fabrication of flexible micro-supercapacitors based on laser carbonization of polyimide sheets. Localized pulsed laser irradiation rapidly converts the pristine polyimide surface into an electrically conductive porous carbon structure in ambient conditions.

O2@carbon cloth hybrid electrode (CC@MnO2), which is synthesized by the defocused-laser ablation method. This CC@MnO2-based symmetric supercapacitor has an excellent specific areal capacitance of 1.53 mF cm-2 at a frequency of 120 Hz and .

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