Electronic Supplementary Information for

Nanoimprint lithography of nanoporous carbon materials for micro-supercapacitor architectures

Stefanie Lochmann, Julia Grothe, Kai Eckhardt, Desirée Leistenschneider, Lars Borchardt, and Stefan Kaskel

Dresden University of Technology, Bergstrasse 66, 01069 Dresden, Germany.
E-mail: stefan.kaskel@tu-dresden.de; Fax: +49 351 463 37287; Tel: +49 351 463 33632

S.1. Methods

Leakage current calculation
Leakage current is calculated measuring the self-discharge in open circuit after pre-charging the micro-EDLC to 1 V. The corresponding leakage current was estimated using the following equation:

$$I_{\text{leak}} = C \cdot \frac{dV}{dt}$$  \hspace{1cm} (1)

Where $I_{\text{leak}}$ is the leakage current, $C$ is the capacitance obtained from the CV curves $dV/dt$ is the discharge rate.

Energy and Power Densities
The electrochemical performance of the micro-EDLC devices was based on galvanostatic charge-discharge measurements. The volumetric energy density ($E_{\text{vol}}$) was obtained from equation (2):

$$E_{\text{vol}} = \frac{A_{\text{dis}} \cdot I}{V_{\text{IDE}} \cdot 3600}$$  \hspace{1cm} (2)

where $A_{\text{dis}}$ is the area of the integrated discharge curve and $I$ the applied current. $V_{\text{IDE}}$ is the complete volume of the interdigital electrodes.

The Volumetric power density ($P$) is calculated from the energy density ($E_{\text{vol}}$) and the discharge time $t_{\text{dis}}$:

$$P_{\text{vol}} = \frac{E_{\text{vol}}}{t_{\text{dis}}}$$  \hspace{1cm} (3)
S.2. Supplementary Figures

S.1

Figure S.1 - SEM images of a CF pyrolyzed at 900 °C (left) and an ACF-30 (right).

S.2

Figure S.2 – Galvanostatic charge/discharge curves of C_{IDT-0,5} (a) and N-C_{IDT-0,5} (b) measured with a current density of 1 mA cm^{-2}.
S.3

Figure S.3 – Cyclic voltammograms of N-CIDE-0.5 at different cycle numbers (5; 500; 1000) measured at a scan rate of 10 mV s\(^{-1}\).

S.4

Figure S.4 – Leakage current and self-discharge characteristics of a N-CIDE-0.5 after charging to 1 V and measuring the self-discharge at open circuit.

At the beginning a high leakage current is observed. After 4.000 seconds the current regulates to a constant value of 1.5·10\(^{-5}\) µA. The leakage current is probably caused by residual carbon between the lines of the two electrodes. An increase of the spacing between the fingers could reduce these effects.