Supporting Information to

Patching Laser-Reduced Graphene Oxide with Carbon Nanodots

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Sample overview

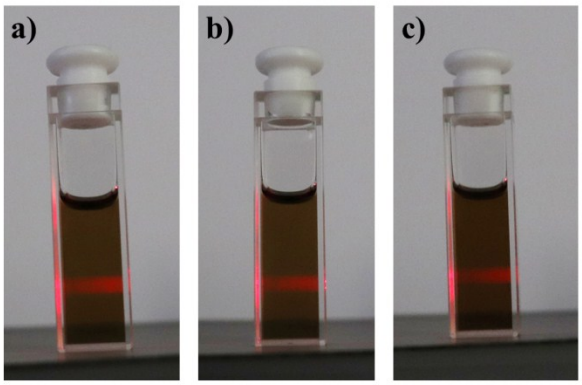

Figure S1. *Photograph of precursor solutions of 1, 3, and 6 in NMP after one week under illumination with a laser pointer demonstrating the Tyndall effect.*

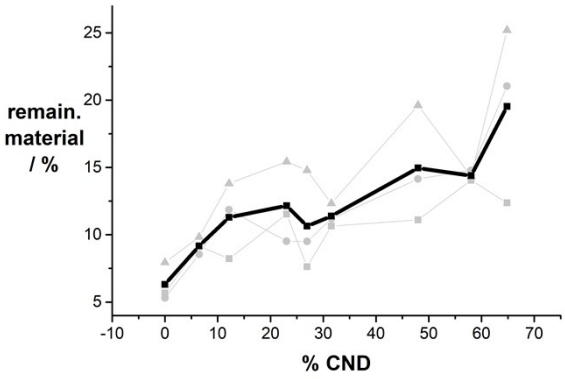

Figure S2. *Percentage of the remaining mass of the films after laser-reduction obtained from a series of experiments (shown in gray).*

Scanning electron microscopy

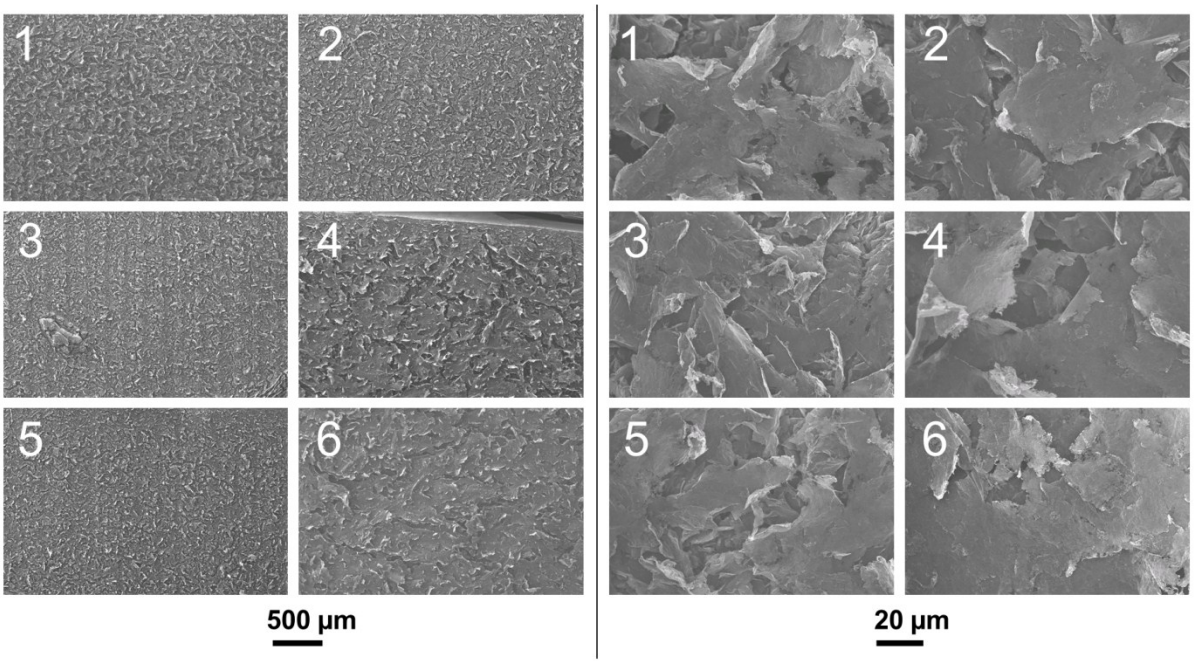

Figure S3. *SEM images of laser-converted films of samples* ***1*** *–* ***6*** *from top left down to bottom right at low-magnification (left) and high-magnification (right), see scale bars.*

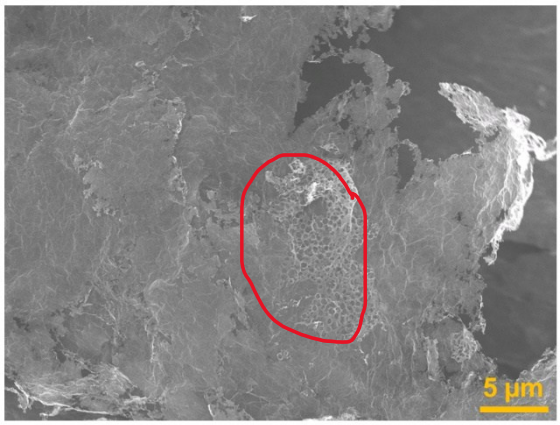

Figure S4. *SEM image of a laser-converted film of sample* ***6*** *showing a converted pattern with excess CNDs.*

Raman spectroscopy

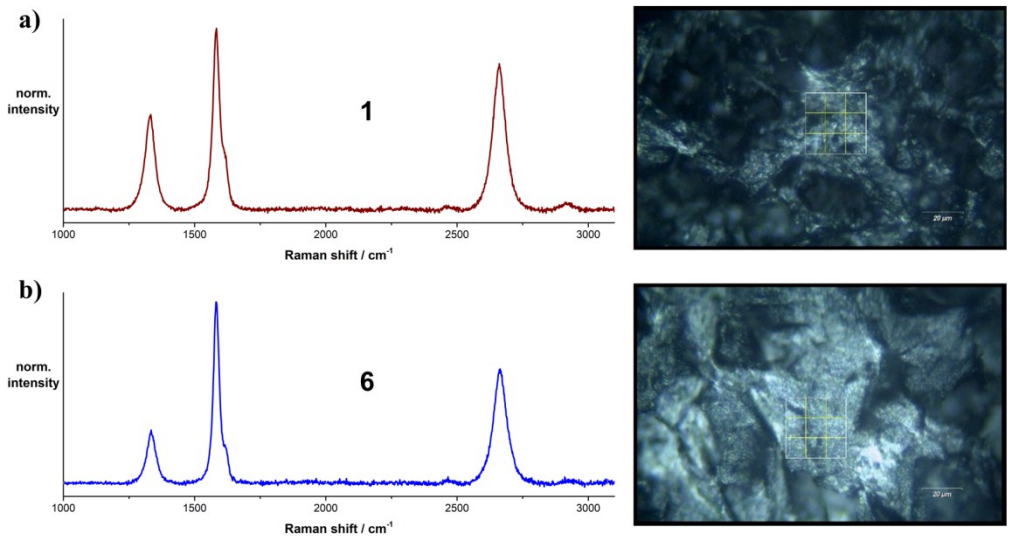

Figure S5. *Averaged Raman spectrum obtained from a map composed of 16 spots (depicted on the right) of laser-reduced samples a)* ***1*** *and b)* ***6*** *using a 633 nm laser as the excitation source.*

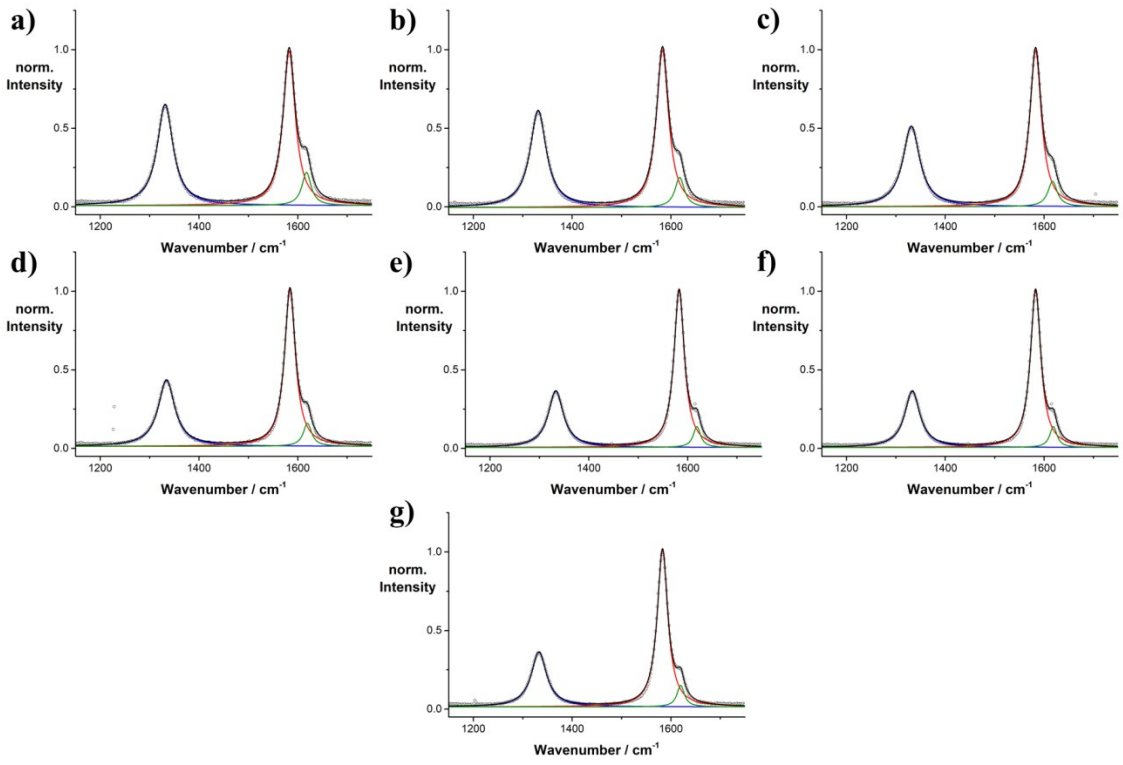

Figure S6. *Lorentz fitting of averaged Raman spectra of laser-reduced samples* ***1*** *– 7 (a – g).*

Transmission electron microscopy and electron energy loss spectroscopy

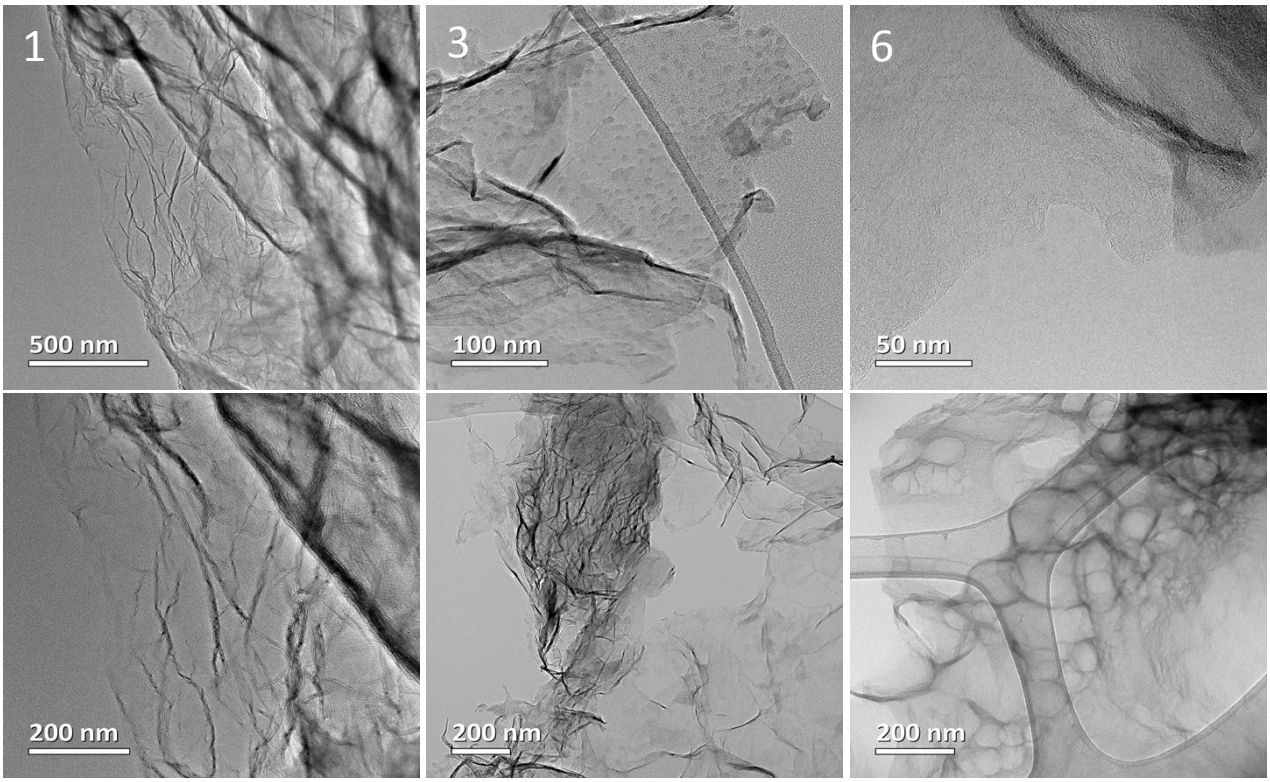

Figure S7. *Representative TEM images of samples* ***1, 3*** *and* ***6*** *obtained at an acceleration voltage of 200 kV.*

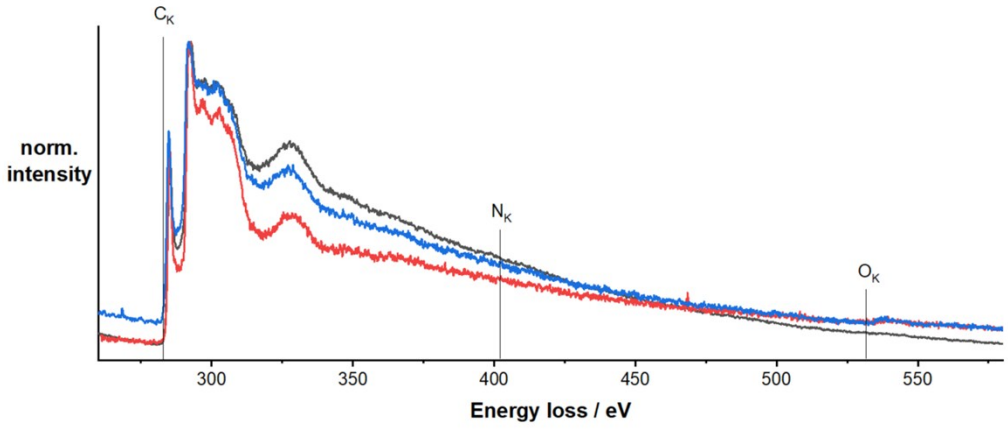

Figure S8. *Electron energy loss spectra of samples* ***1*** *(black),* ***3*** *(red) and* ***6*** *(blue).*

Specific surface area measurements

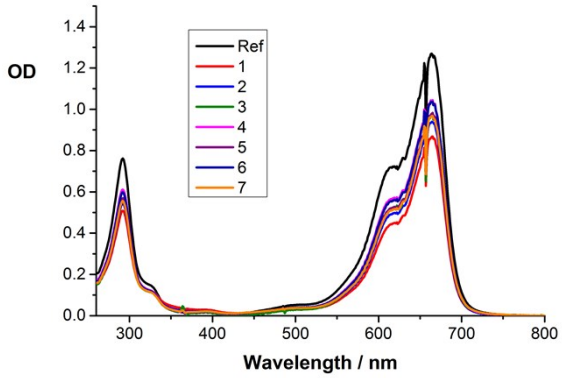

Figure S9. *UV-vis absorption spectra of the methylene blue stock solution ($c = 4.3 \times 10^{-5}$ M) in black and the same solution after adsorbing. ~0.1 mg of samples* ***1*** *–* ***7****.*

Voltammetry

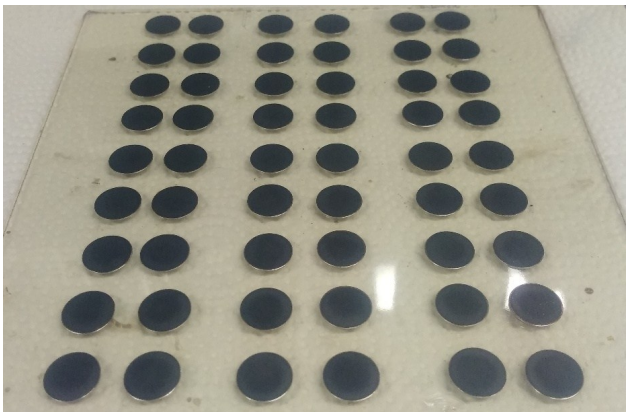

Figure S10. *Photograph of the laser-reduced films on stainless-steel disks.*

Three-electrode measurements

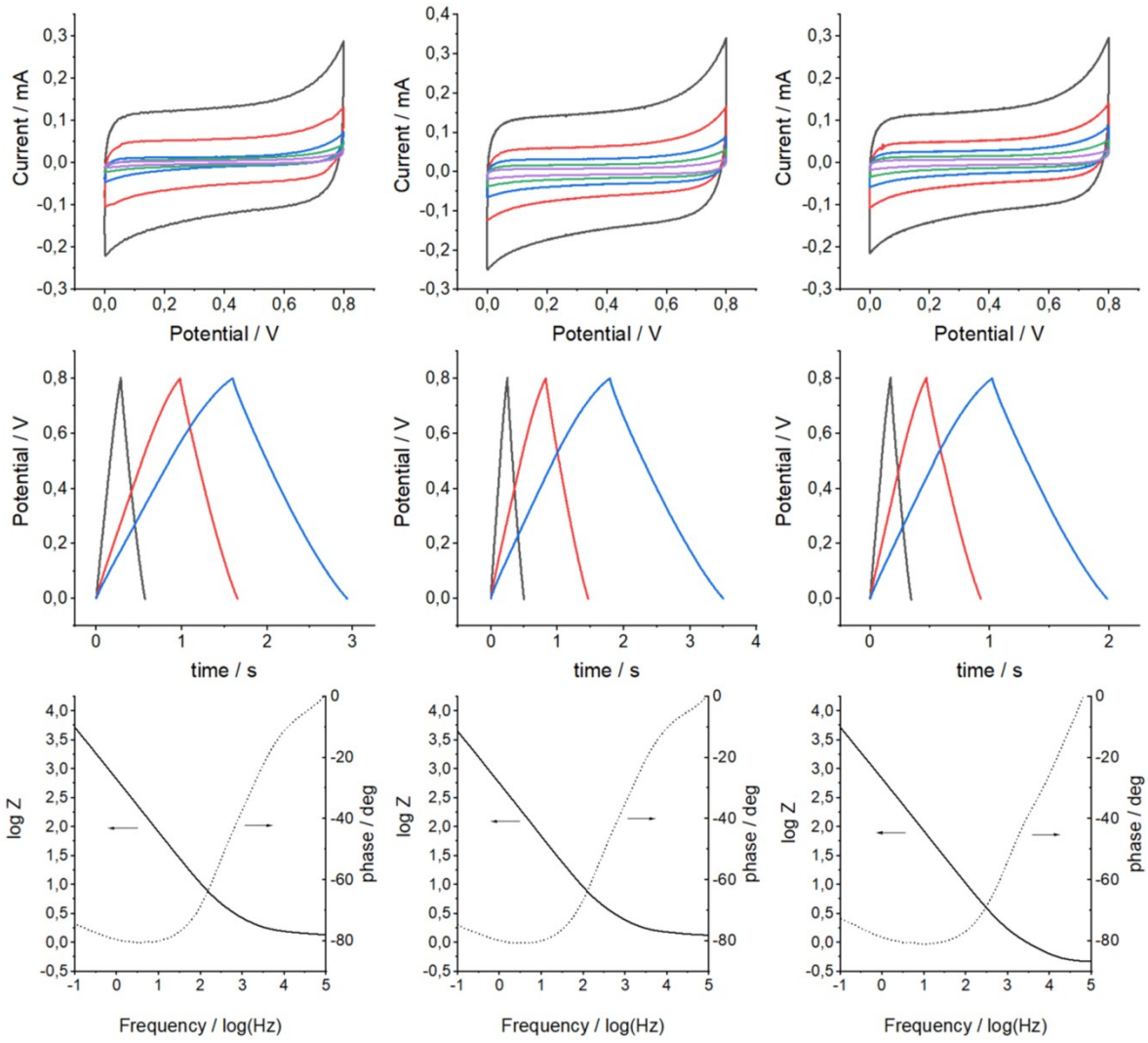

Figure S11. *Electrochemical characterization electrodes fabricated from samples* ***1*** *(left column),* ***3*** *(center), and* ***6*** *(right) in 1.0 M Na_2SO_4 using an Ag/AgCl reference electrode; a) Cyclic voltammograms in 1.0 M Na_2SO_4 as electrolyte at different scan rates between 500 and 10 mV s^{-1}; b) Galvanostatic charge discharge curves obtained at different current densities of 7 (blue), 9 (red), and 10 (black) Ag^{-1} in 1.0 M Na_2SO_4; c) Representative Bode impedance plots of the electrodes in 1.0 M Na_2SO_4 as the electrolyte.*

Reference measurements in organic electrolyte

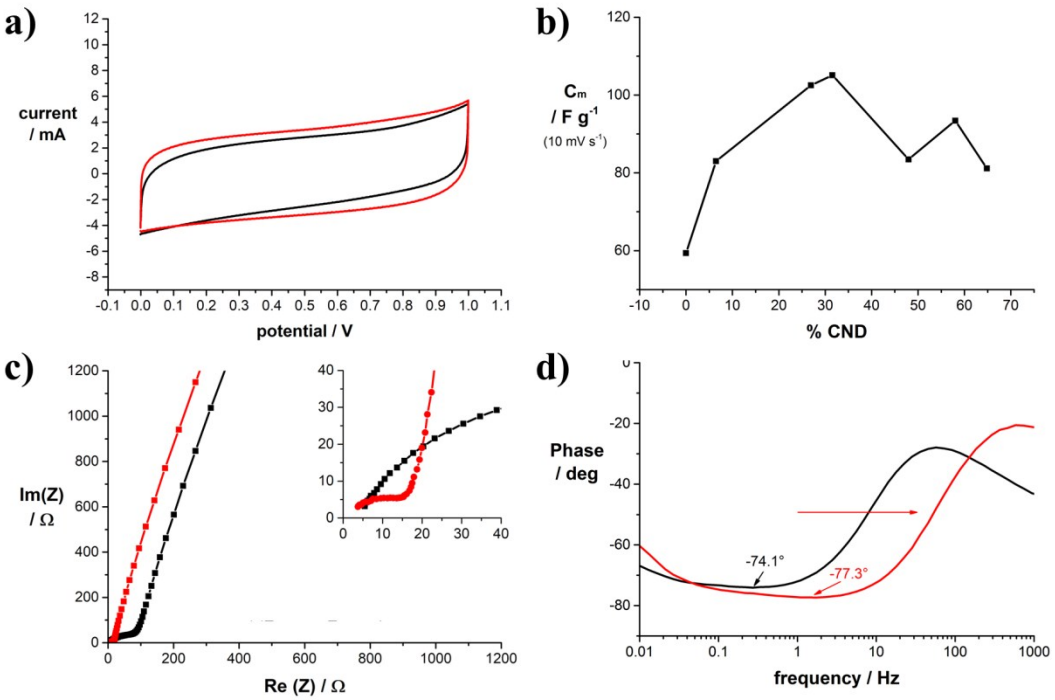

Figure S12. *Electrochemical characterization of symmetric coin cell capacitors with different CND/GO mass ratios; a) Representative cyclic voltammograms of coin cell capacitors assembled with electrodes of sample* ***1*** *(black) and sample* ***5*** *(red) in 0.5 M $TBAPF_6$ in acetonitrile as electrolyte at a scan rate of 100 mV s^{-1}; b) Specific gravimetric capacitance versus mass fraction of CNDs contained in the precursor solution determined by cyclic voltammetry at a scan rate of 10 mV s^{-1}; c) Representative Nyquist impedance plots of coin cell capacitors assembled with electrodes of sample* ***1*** *(black) and sample* ***5*** *(red) in 0.5 M $TBAPF_6$ in acetonitrile as the electrolyte; d) Representative Phase-angle diagrams of coin cell capacitors assembled with electrodes of sample* ***1*** *(black) and sample* ***5*** *(red) in 0.5 M $TBAPF_6$ in acetonitrile as the electrolyte;*

Capacitance

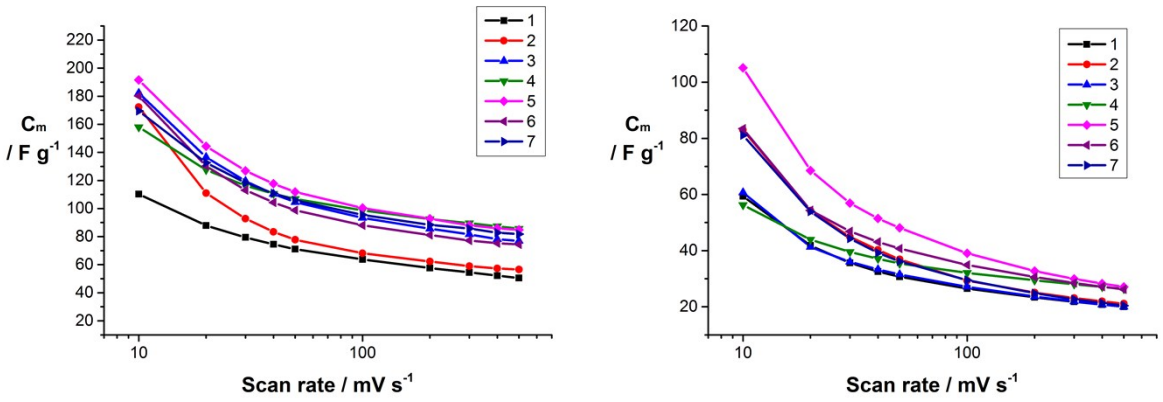

Figure S13. *Specific gravimetric capacitances of samples* ***1*** *– 7 as a function of the scan rate in 6.0 M KOH (left) and in 0.5 M $TBAPF_6$ in acetonitrile as electrolyte (right).*

Galvanostatic charge-discharge measurements

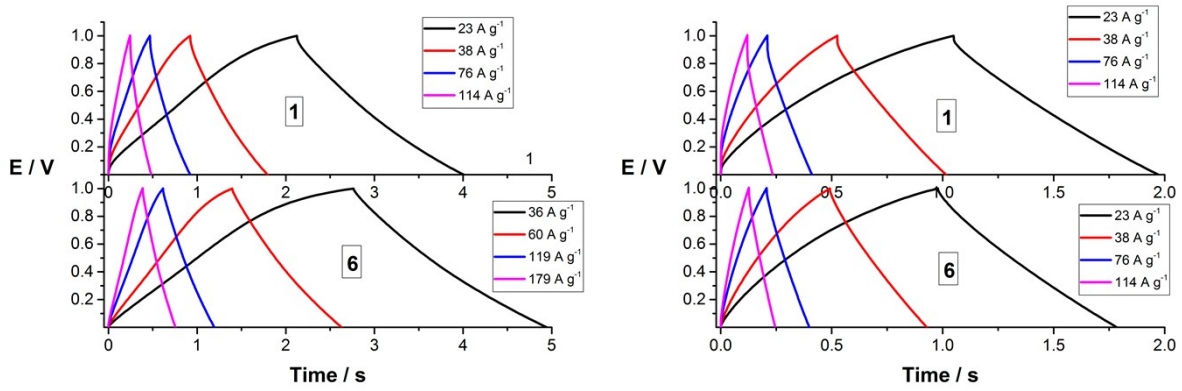

Figure S14. *Galvanostatic charge discharge curves of samples* ***1*** *and* ***6*** *obtained at different current densities in 6.0 M KOH (left) and 0.5 M* $TBAPF_6$ *in acetonitrile (right).*

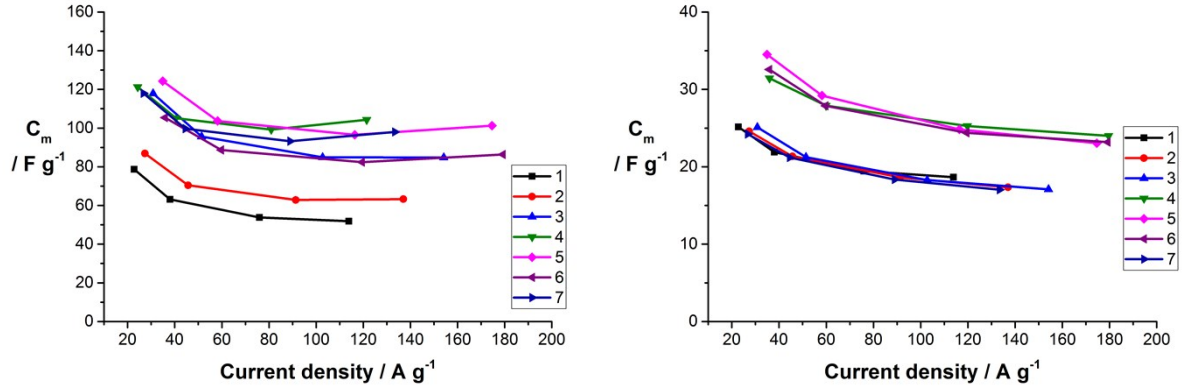

Figure S15. *Specific gravimetric capacitances of samples* ***1*** *– 7 as a function of the current density in 6.0 M KOH (left) and in 0.5 M* $TBAPF_6$ *in acetonitrile as electrolyte (right).*

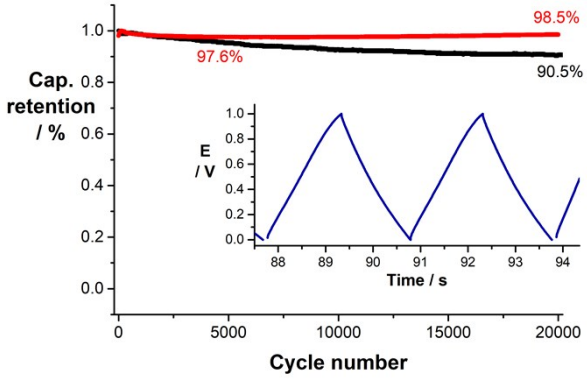

Figure S16. *Capacitance retention of capacitor cells with sample* ***1*** *(black) and sample* ***6*** *(red) in 6.0 M KOH after 20,000 charge discharge cycles. Inset: Galvanostatic charge discharge curves of sample* ***6*** *obtained with a current density of 7.5 A* g^{-1}.

Electrochemical impedance spectrosocpy

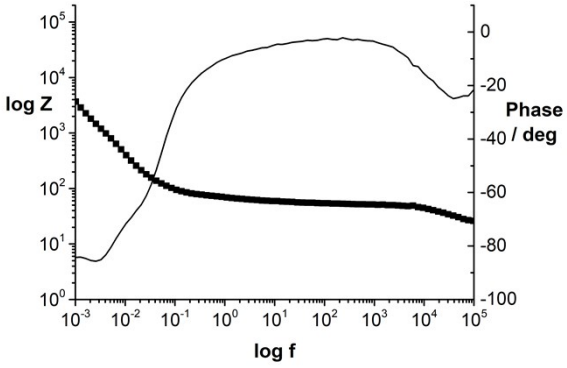

Figure S17. *Representative Bode plot of a commercial activated carbon based EDLC.*

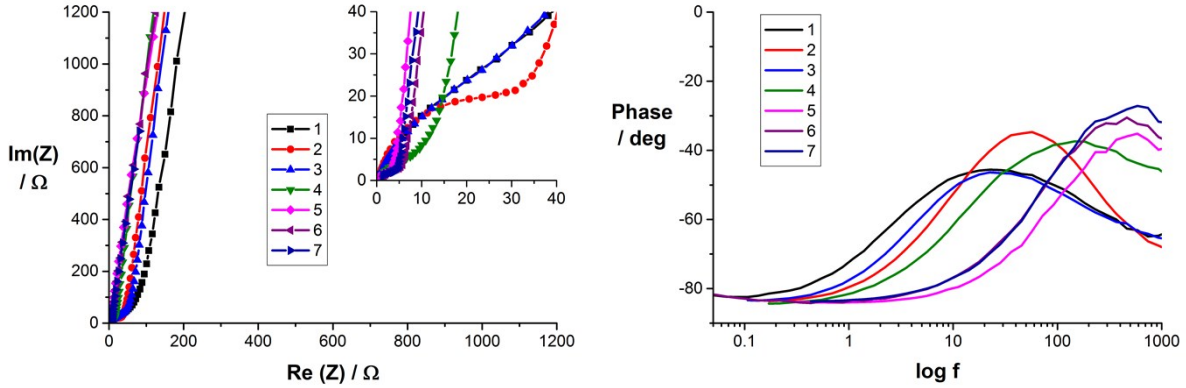

Figure S18. *Left: Nyquist impedance plots of coin cell capacitors assembled with electrodes of samples* ***1*** *–* ***7*** *in 6.0 M KOH as electrolyte; Right: Phase angle plots of coin cell capacitors assembled with electrodes of samples* ***1*** *–* ***7*** *in 6.0 M KOH as the electrolyte.*

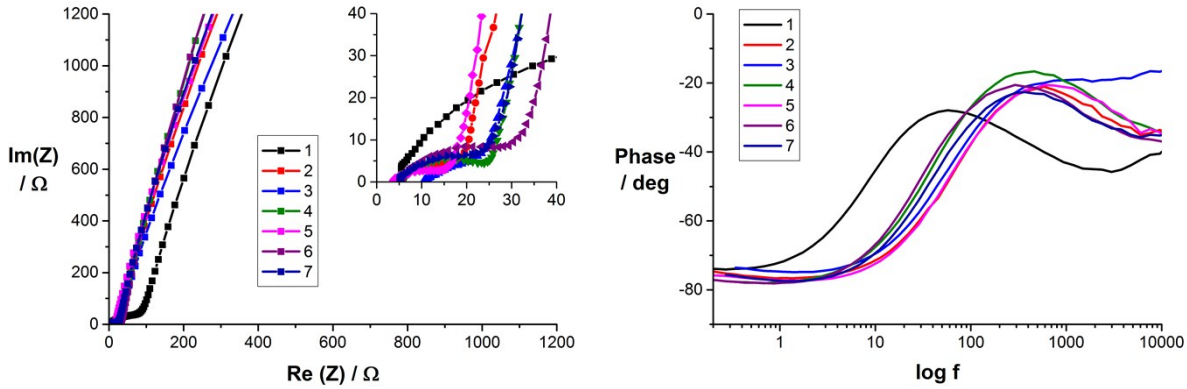

Figure S19. *Left: Nyquist impedance plots of coin cell capacitors assembled with electrodes of samples* ***1*** *–* ***7*** *in 0.5 M* $TBAPF_6$ *in acetonitrile as the electrolyte; Right: Phase angle plots of coin cell capacitors assembled with electrodes of samples* ***1*** *–* ***7*** *with 0.5 M* $TBAPF_6$ *in acetonitrile as the electrolyte.*