Development of an Efficient Voltammetric Sensor for the Monitoring of 4-Aminophenol based on Flexible Laser Induced Graphene Electrodes Modified with MWCNT-PANI

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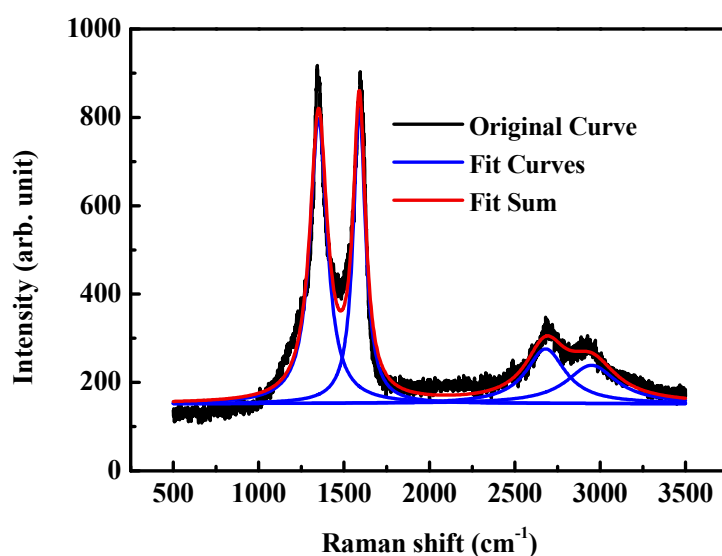* Correspondence: olfa.kanoun@etit.tu-chemnitz.de (O.K.); Tel.: +491795392601

Figure S1. Raman spectrum of laser induced carbon.

The Raman spectroscopy was done to characterise the LIC electrode. The fitted spectra presents two Raman-region. The region one is below 2000 cm^{-1} related to D sp3 carbon atoms of disordered graphite and the G peak associated to the E2g mode of graphite referring to the in-plane vibration of sp2 carbon atoms in a 2D hexagonal lattice [1]. The second is linked to 2D and D+G peaks, the presence of defect-induced contributions is characterized by the 2D peak, whereas, the D+G combination peak strongly supports the presence of a higher disorder structure of graphene with oxygen-containing groups [2]. The atomic structure of laser induced carbon has been proposed to be a few-layers of graphene "pyrolytic carbon" [3] with a non-uniform scope of the oxygen-containing groups, coming about in sp2 carbon clusters of some nanometers disconnected inside an imperfect carbon grid or the sp3 network.
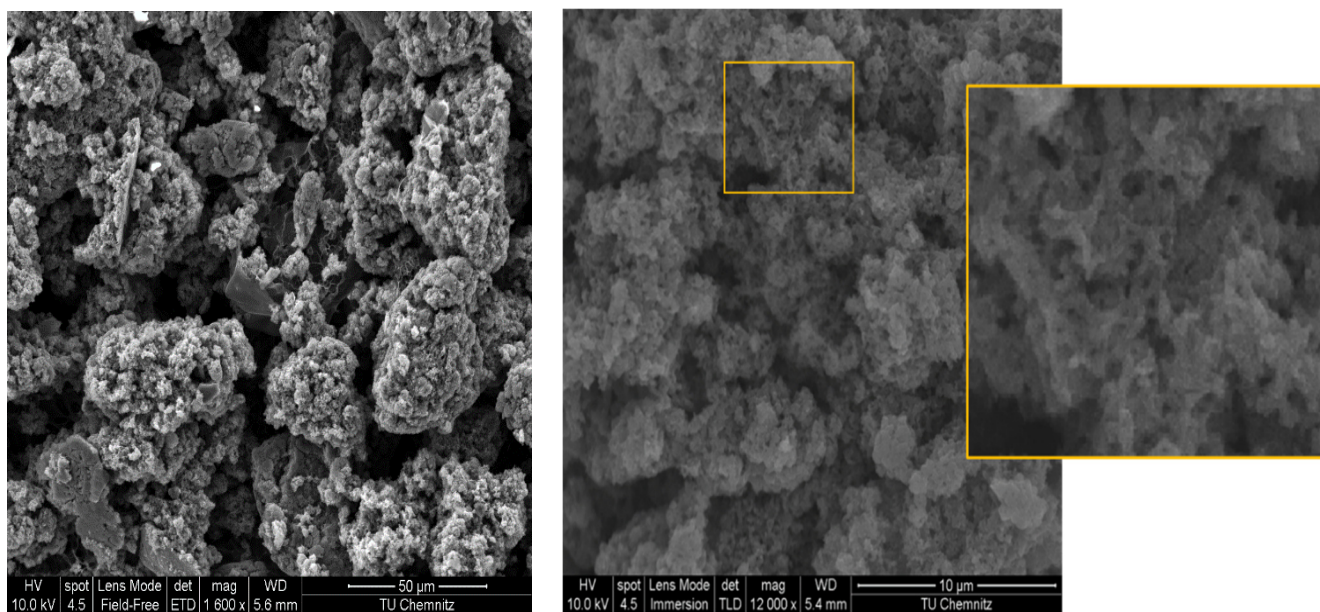
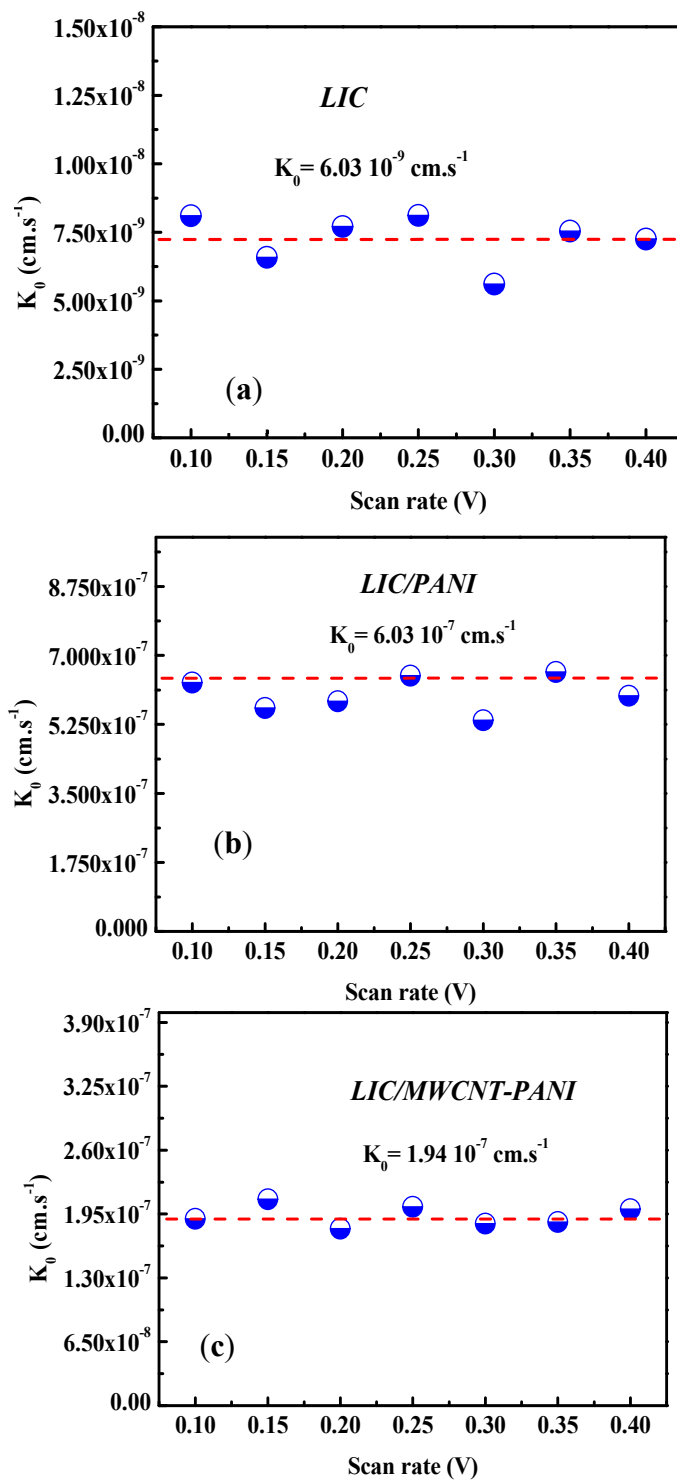**Figure S2.** SEM of LIC/MWCNT-PANI.

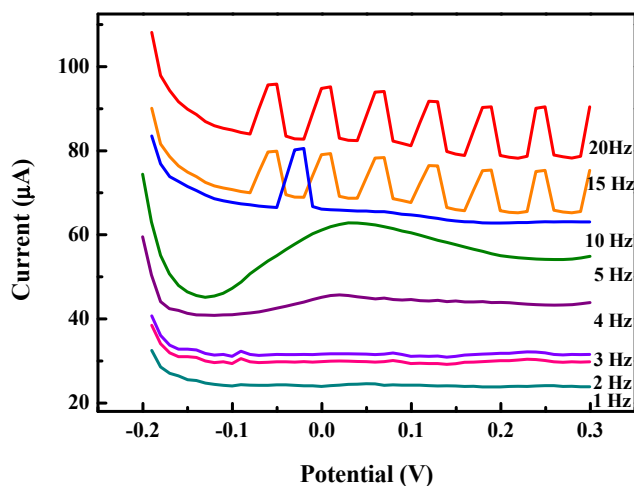**Figure S3.** Klingler-Kochi analyses of the calculated ET rates (k0) for each scan rate.

Figure S4. SWV of 1.0 μM 4-AP in PBS (pH=6.5) at different frequencies from 1.0 Hz to 20 Hz.
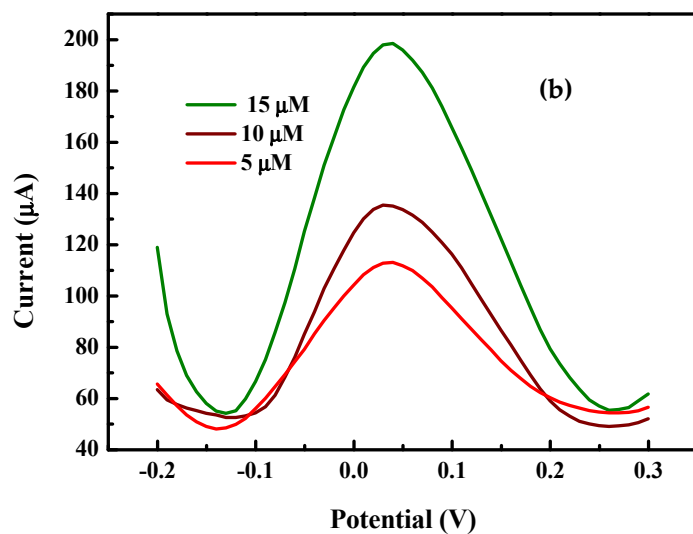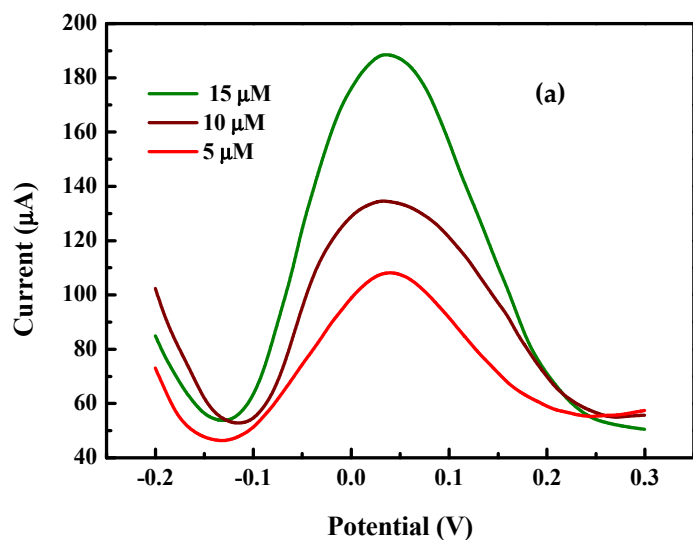

Figure S5. a) SWV in water samples **b)** in Paracetamol samples.

References

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