Supplementary information to

Laser-Induced Breakdown Spectroscopy as an advanced method for analysis of nanocarbon materials chemical composition

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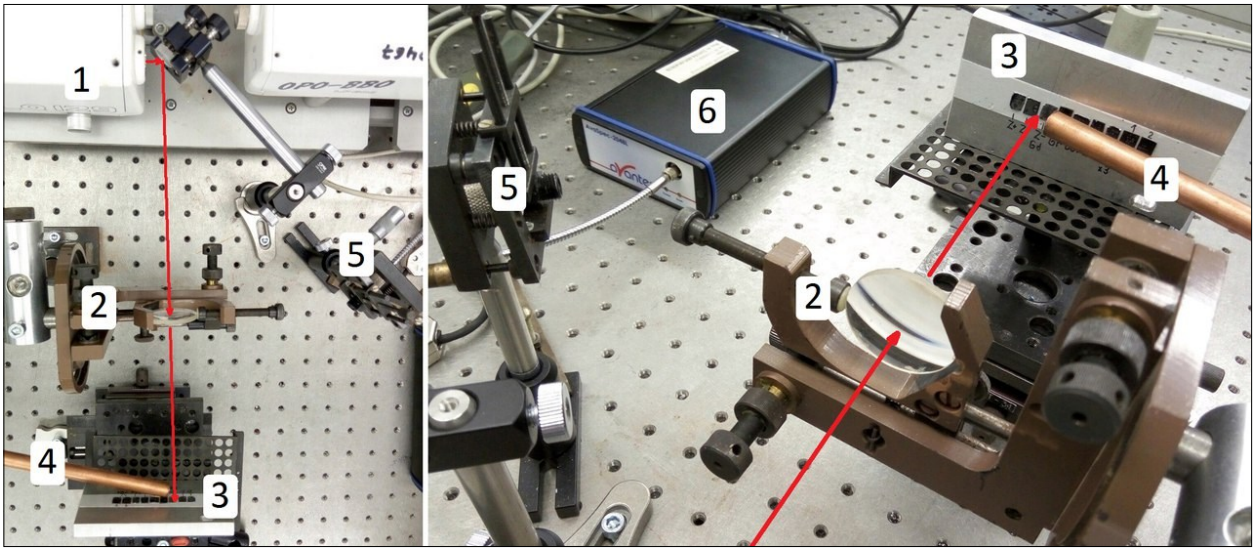

Fig.S1 LIBS setup used in experiments. 1 – Nd:YAG laser; 2 – Focusing lens; 3 – Stand with samples; 4 – Nozzle for argon supply; 5 – Fiber detector; 6 – Spectrograph.

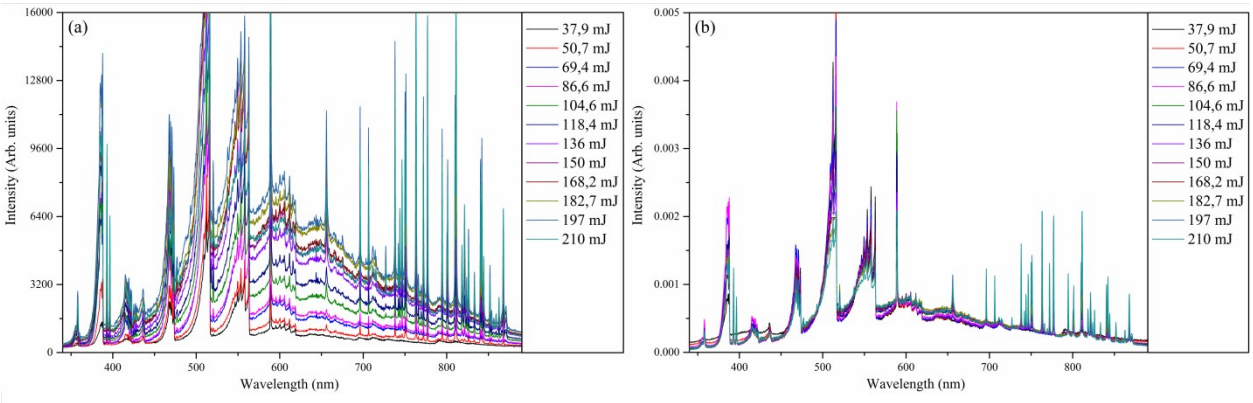

Figure S2. Illustration of the normalization procedure for group of plasma emission spectra. All spectra were acquired in the argon atmosphere with different energies of laser pulse for the same graphene oxide sample. (a) As obtained LIBS spectra. (b) Same spectra after normalization. As seen, applied procedure result in alignment of the spectra background signal spectra allowing its correct subtraction.

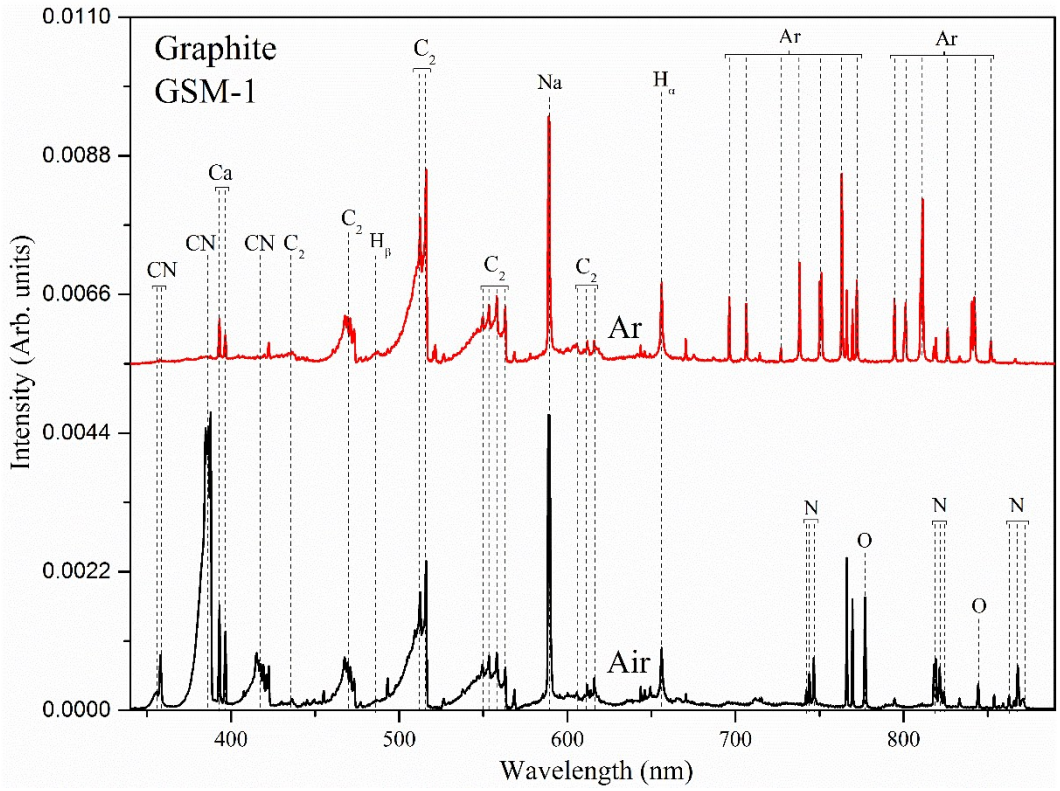

Figure S3. LIBS broadband spectra of the crystalline graphite, obtained in air and argon atmosphere with a pulse energy of 69,4 mJ and delay time of 1,4 μs. Absence of prominent CN molecular emission bands in ultraviolet spectra region along with N and O atomic emission lines in the near-infrared spectral region indicates complete absence of plasma plume interaction with the surrounding air due to the applied argon flow.

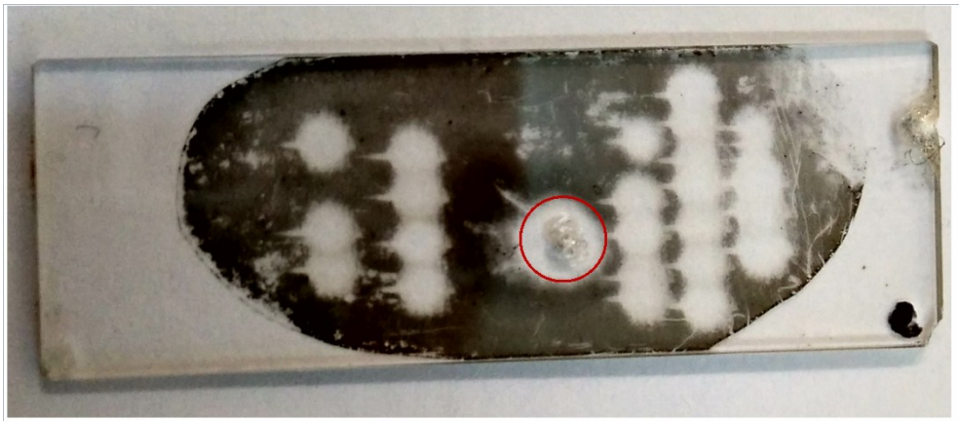

Figure S4. Photo of the rGO film on quartz substrate after its ablation during the experiments. As seen, no fragmentation of substrate can be observed in multiple areas of GO film ablation. The marked spot indicates area where substrate was advisedly disrupted after 15 consequtive laser pulses.

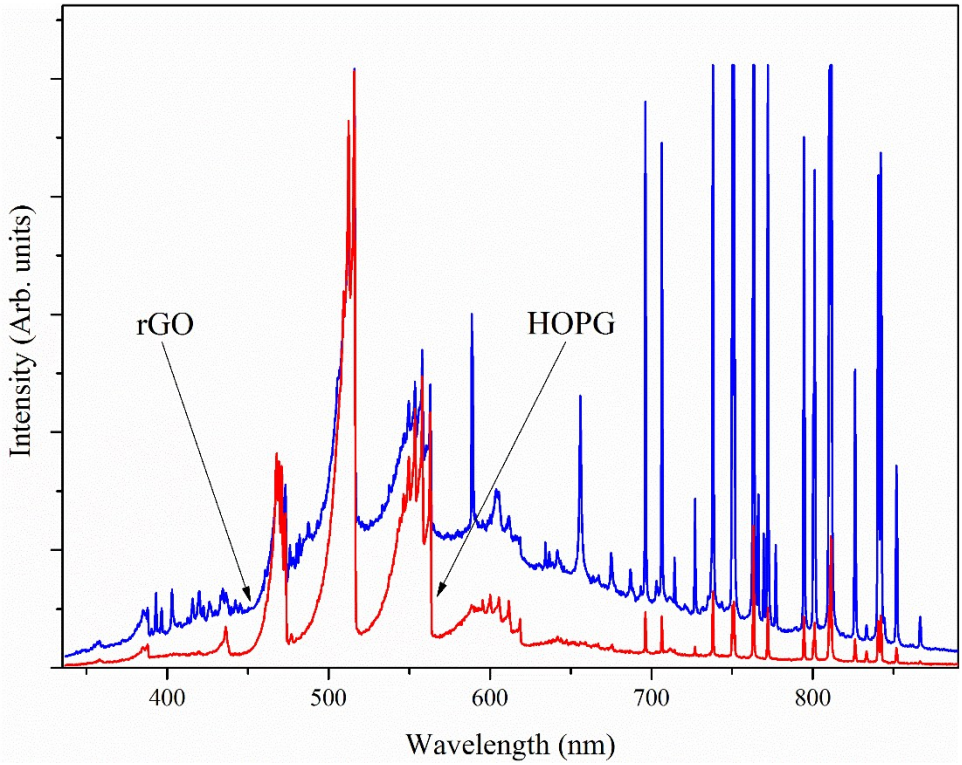

Figure S5. Difference in form and intensity of background signal arising from sample thickness as demonstrated by comparison of emission spectra for reduced graphene oxide film (thickness ~ 100 nm) and HOPG sample (thickness ~ 1 mm) obtained in argon atmosphere with same experimental conditions - pulse energy of 69,4 mJ and delay time of 1,4 μs. As seen, almost no background signal can be observed in the case of HOPG whereas apparent broadband background appears in the plasma emission spectrum of the rGO film.