**Supplementary Information**

# Graphene as photothermal switch for controlled drug release

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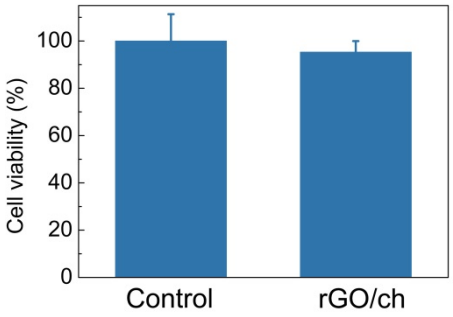


**Fig. S1.** Cytotoxicity of rGO/ch films. HeLa cells were allowed to grow for 24h and then incubated with 1 mg $mL^{-1}$ rGO/ch (rGO/ch) or ch (Control, devoid of rGO) samples for an additional 24 h. The MTT test for cell viability was subsequently performed. The data, which represent the mean±SD of 9 samples, are expressed as percentage of the control (taken as 100%).

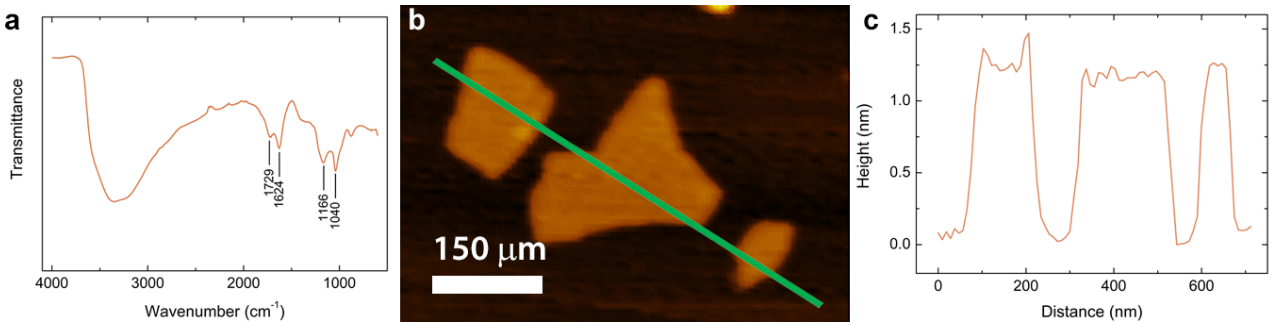


**Fig. S2.** (a) ATR-FTIR spectrum of GO nanosheets. Major bands and proposed assignments: 1729 $cm^{-1}$ $\nu$(C=O), 1624 $cm^{-1}$ skeletal vibrations of unoxidized graphitic domains, 1166 $cm^{-1}$ $\nu$(C-OH), 1040 $cm^{-1}$ $\nu$(C-O) [Galande, C.& Mohite, A.D.& Naumov, A.V.& Gao, W.& Ci, L.& Ajayan, A. et al., "Quasi-molecular fluorescence from graphene oxide", Sci Rep, vol. 85, 2011, p.1-5]; (b,c) AFM topography of GO nanosheets and z profile. GO shows a height of 1.0 – 1.25 nm, which corresponds to that of a single layer graphene sheet [Becerril, H. A.; Mao, J.; Liu, Z.; Stoltenberg, R. M.; Bao, Z.; Chen, Y. ACS Nano 2008, 2, 463.].

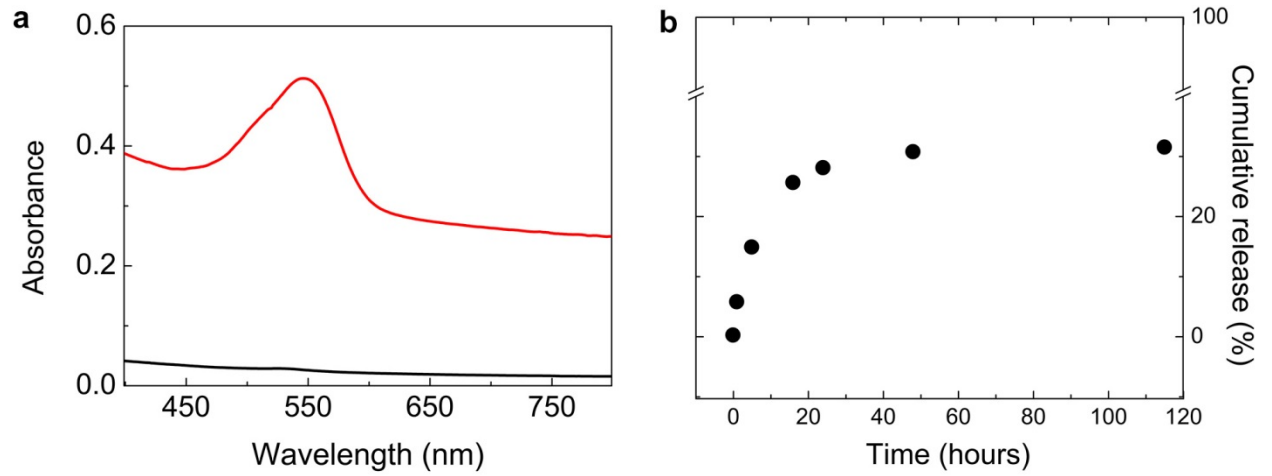


**Fig. S3.** (a) Comparison between the absorbance signals of R6G contained within a rGO/ch film (red) and within a ch film (black, i.e. devoid of rGO) in PBS pH 7.4 at room temperature registered 24h after their fabrication. The rGO nanosheets contained within the hybrid films provide an enhanced chemical retention that is not the case for bare ch films . (b) Ground release of R6G (i.e. without laser illumination) from a rGO/ch film during 120h from its fabrication when immersed in a PBS solution (pH 7.4) at room temperature. A ~30% of drug content is lost after 24 hours; afterwards, a minimal release is observed.

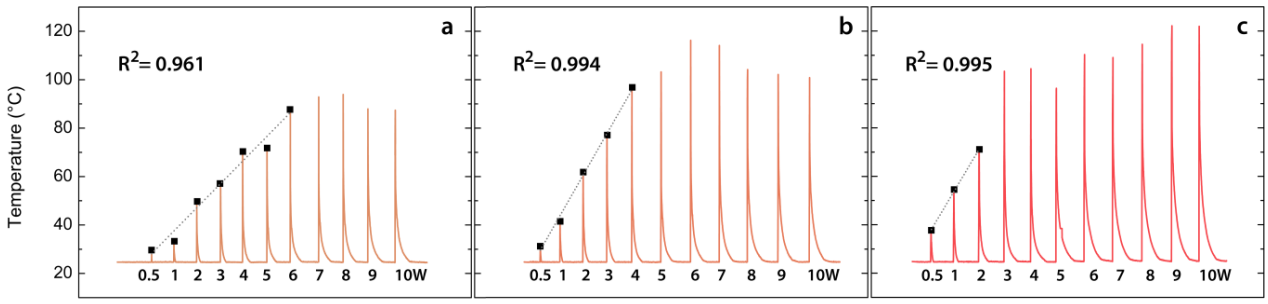


**Fig. S4.** Laser pulses of 100 ms (a), 200 ms (b) and 400 ms (c) as a function of laser power. A good linear trend in the fitting of maximum temperature peaks below 100 °C that extends up to 4 W can be observed for case (b). Conversely a scarce energy content and linearity is apparent for cases (a) and (c), respectively. The laser spot is 1.25 mm in size.

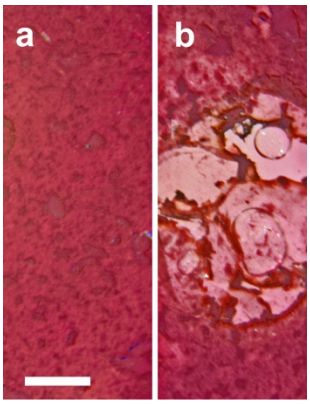


**Fig. S5.** Thermal damages produced at high laser intensity. rGO/ch films treated with single 200 ms-long pulses at 33 J $cm^{-2}$ (a) and 130 J $cm^{-2}$ (b). Vapor bubbles are generated at high laser fluences, which induce irreversible damages to the film (bar = 0.5 mm).

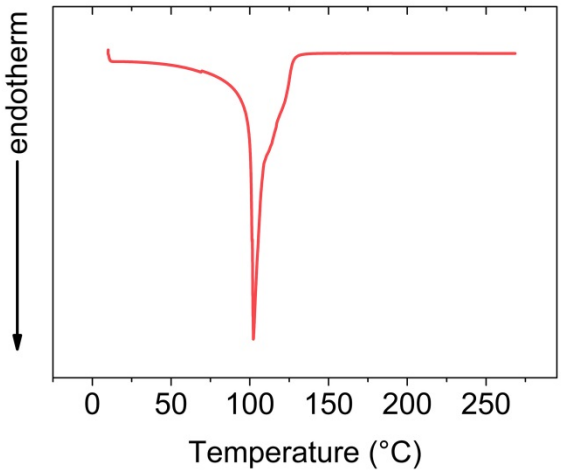


**Fig. S6.** Thermogram of a rGO/ch film showing a main endothermic transition that is attributed to water evaporation (5 K $min^{-1}$)

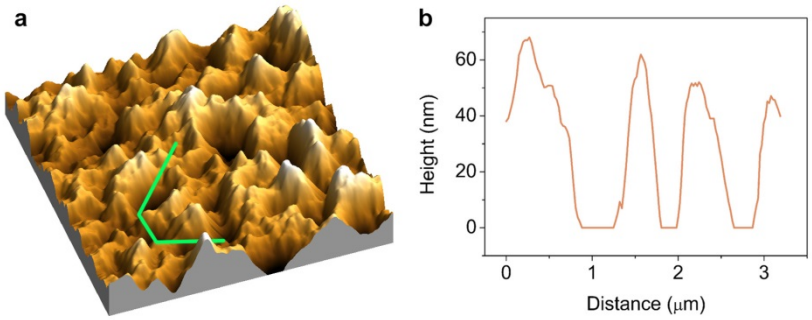


**Fig S7**. (a) 3D AFM topography of the surface of a rGO/ch film that reveals pores with a size included within the 100 ÷ 600 nm range (b).