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Supporting Information

Shedding Light into the Soft and Efficient Free Radical Induced Reduction of Graphene Oxide: Hidden Mechanisms and Energetics

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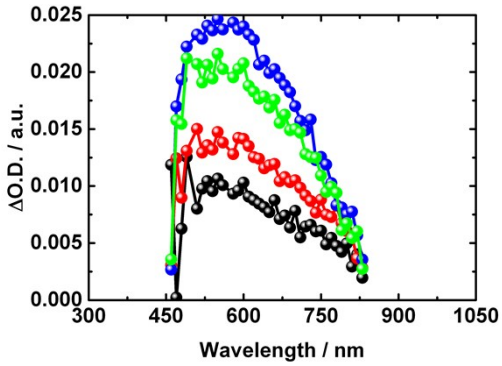

Figure S1. Differential absorption spectra obtained upon electron pulse radiolysis (100 Gy, 15 ns FWHM) of 0.8 mg x ml^{-1} **oxo-G_1** in N_2O saturated aqueous solution in containing with time delays of 5 µs (black spectrum), 10 µs (red spectrum), 25 µs (green spectrum) and 50 µs (blue spectrum) after the electron pulse.

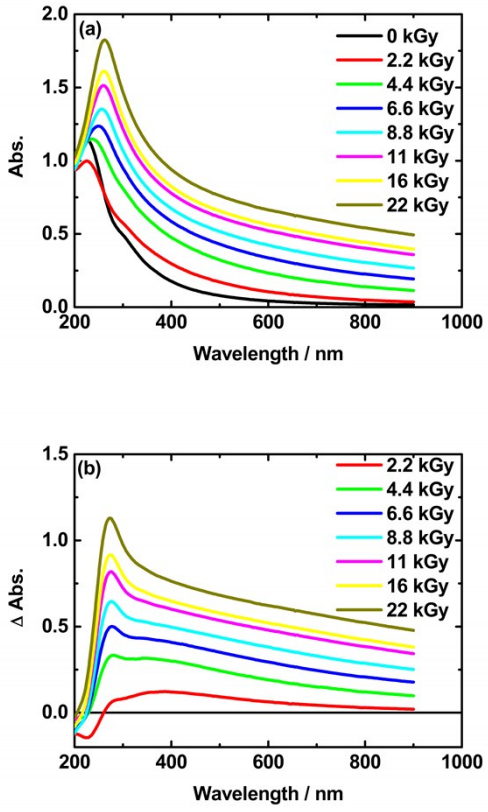

Figure S2. a) UV-Vis spectra of nitrogen saturated aqueous **CT-GO** solutions (0.4 mg/ml) containing 2 wt% 2-propanol upon electron beam radiation with different absorbed radiation doses. The samples were diluted with water (1:9) after irradiation and measuring the UV-vis spectra in order keep the absorption in a reasonable measurable range. b) Corresponding change in absorption obtained from the spectra in (a) by subtracting the spectra before irradiation from the spectra measured after irradiation.

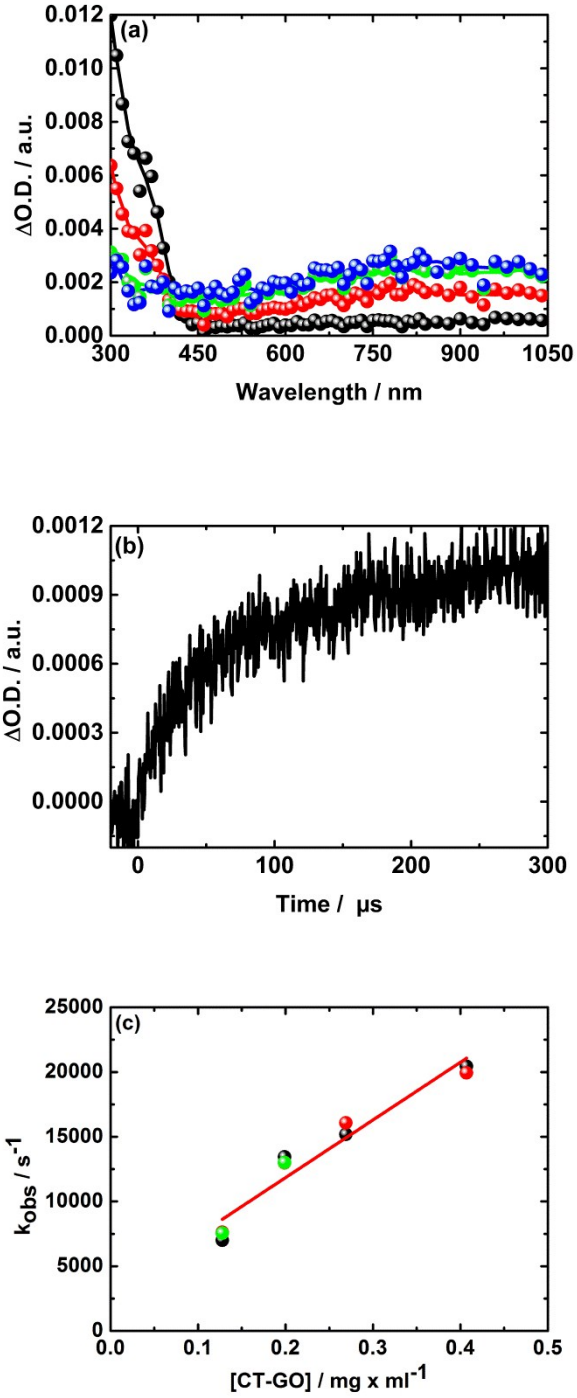

Figure S3. (a): Differential absorption spectra obtained upon electron pulse radiolysis (100 Gy, 15 ns FWHM) of 0.13 mg x ml^{-1} **CT-GO** in N_2O saturated aqueous solution in containing of 5 x 10^{-3} M HCOONa with time delays of 10 µs (black spectrum), 50 µs (red spectrum), 200 µs (green spectrum) and 300 µs (blue spectrum) after the electron pulse. (b): Corresponding absorption time profiles at 700 nm. (c): Plot of the pseudo-first-order rate constants taken from the 700 nm absorption time profiles vs. the **CT-GO** concentration measured with an absorbed dose of 100 Gy / pulse (black), 50 Gy / pulse (red) and 20 Gy / pulse (green).

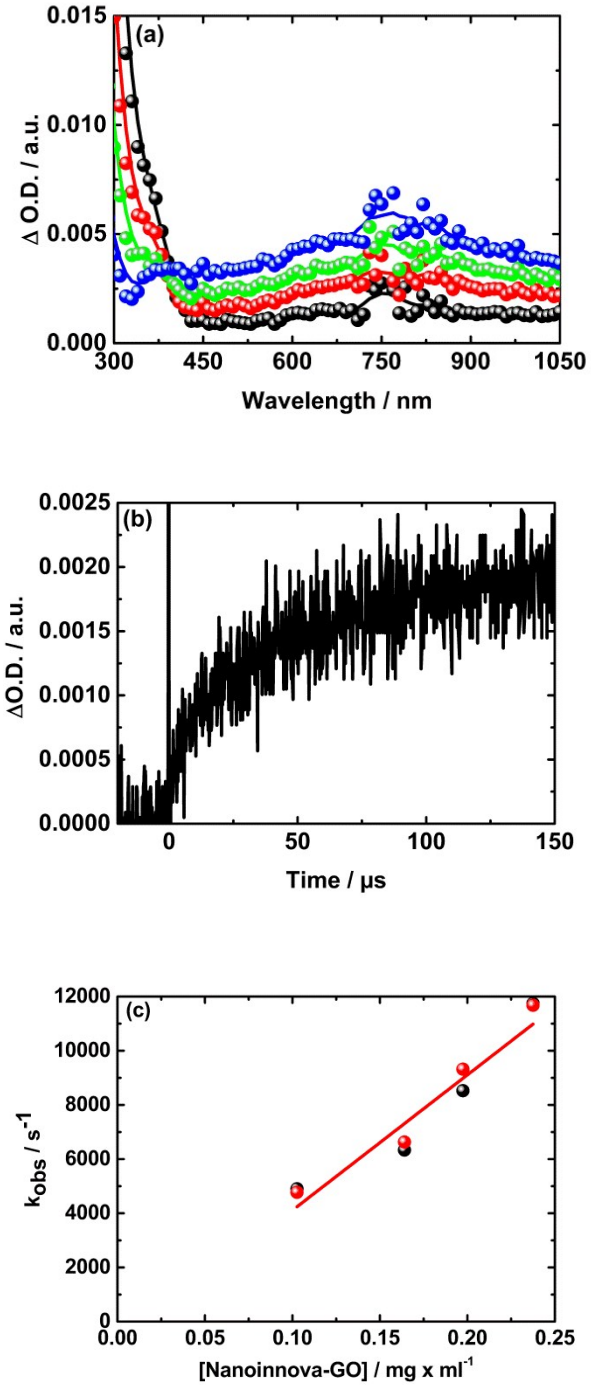

Figure S4. (a): Differential absorption spectra obtained upon electron pulse radiolysis (100 Gy, 15 ns FWHM) of 0.10 mg x ml^{-1} **NI-GO** in N_2O saturated aqueous solution in containing of 5 x 10^{-3} M HCOONa with time delays of 5 µs (black spectrum), 20 µs (red spectrum), 50 µs (green spectrum) and 150 µs (blue spectrum) after the electron pulse. (b): Corresponding absorption time profiles at 700 nm. (c): Plot of the pseudo-first-order rate constants taken from the 700 nm absorption time profiles vs. the **NI-GO** concentration measured with an absorbed dose of 50 Gy / pulse (red) and 20 Gy / pulse (black).

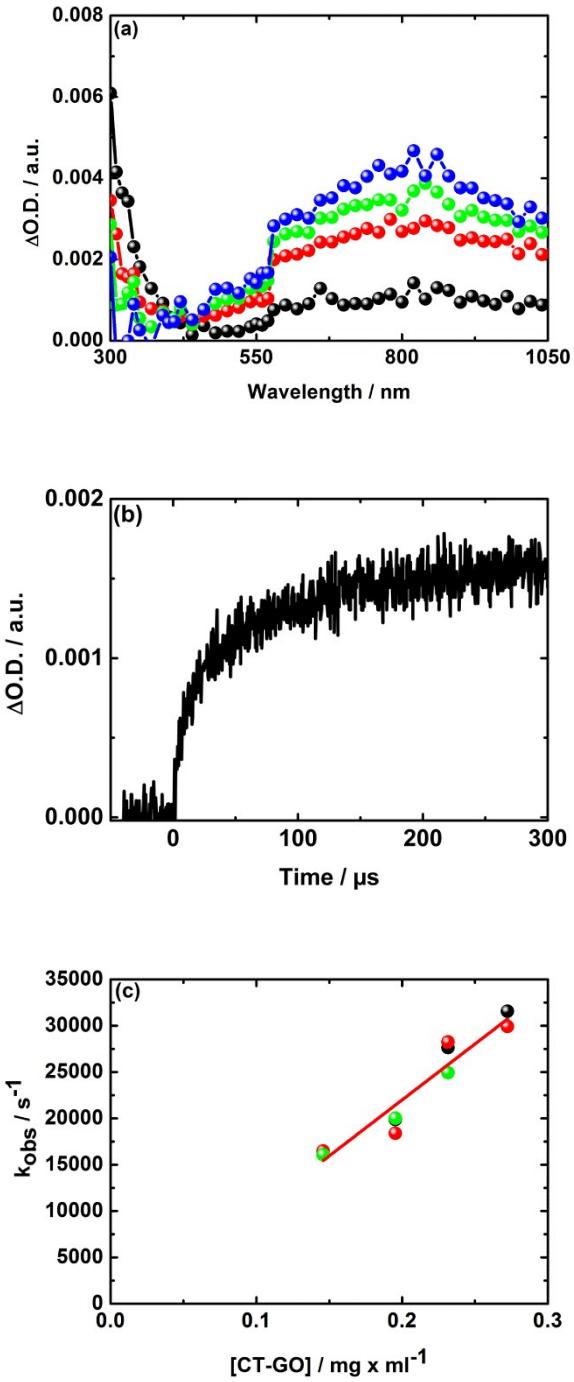

Figure S5. (a): Differential absorption spectra obtained upon electron pulse radiolysis (100 Gy, 15 ns FWHM) of 0.15 mg x ml^{-1} **CT-GO** in N_2O saturated aqueous solution in the presence of 5 vol% 2-propanol with time delays of 15 µs (black spectrum), 50 µs (red spectrum), 100 µs (green spectrum) and 250 µs (blue spectrum) after the electron pulse. (b): Corresponding absorption time profiles at 700 nm. (c): Plot of the pseudo-first-order rate constants taken from the 700 nm absorption time profiles vs. the **CT-GO** concentration measured with an absorbed dose of 100 Gy / pulse (black), 50 Gy / pulse (red) and 20 Gy / pulse (green).

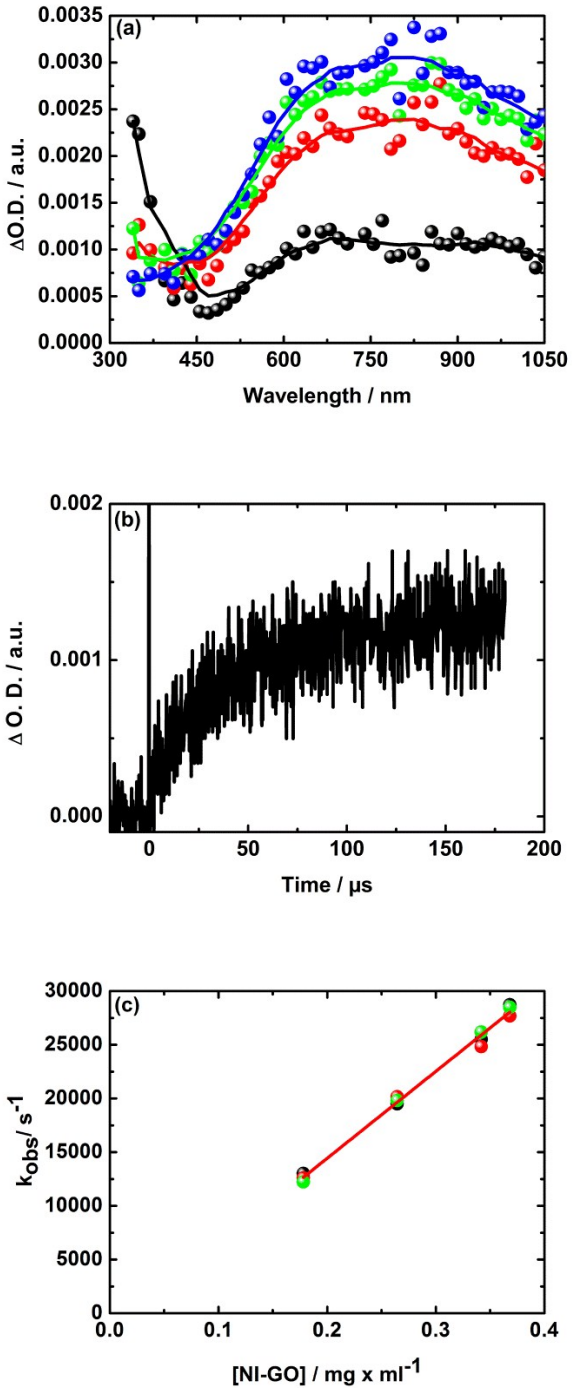

Figure S6. (a): Differential absorption spectra obtained upon electron pulse radiolysis (100 Gy, 15 ns FWHM) of 0.34 mg x ml^{-1} **NI-GO** in N_2O saturated aqueous solution in the presence of 5 vol% 2-propanole with time delays of 10 µs (black spectrum), 50 µs (red spectrum), 100 µs (green spectrum) and 150 µs (blue spectrum) after the electron pulse. (b): Corresponding absorption time profiles at 700 nm. (c): Plot of the pseudo-first-order rate constants taken from the 700 nm absorption time profiles vs. the **NI-GO** concentration, measured with an absorbed dose of 100 Gy / pulse (black), 50 Gy / pulse (red) and 20 Gy / pulse (green).