SUPPORTING INFORMATION

Picosecond pulse radiolysis of the liquid diethylcarbonate

Fayçal Torche, Abdel Karim El Omar, Philippe Babilotte, Sébastien Sorgues, Uli Schmidhammer, Jean-Louis Marignier, Mehran Mostafavi, Jacqueline Belloni*

Laboratoire de Chimie Physique, ELYSE, UMR 8000 CNRS-UPS, Bât. 349, Université Paris-Sud, 91405 Orsay, France

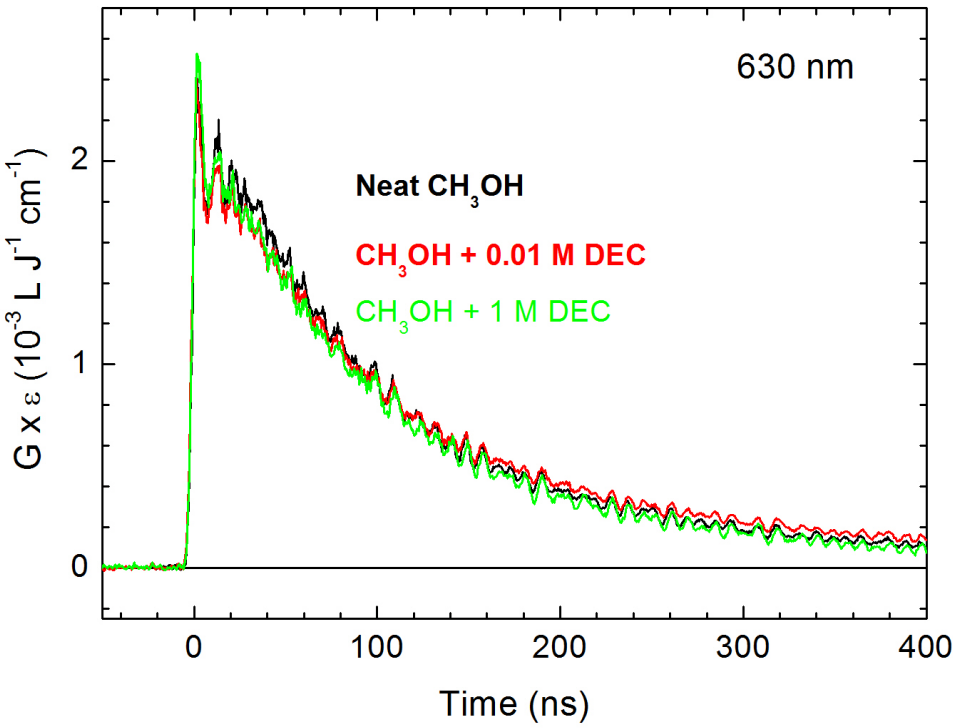

Figure S1. Comparison of absorbance decays at 630 nm of the solvated electron in neat methanol and in solutions of DEC in methanol at 0.01 and 1 mol L^{-1}. The absence of influence of DEC on the decay indicates that no reaction occurs between e_{CH3OH}^- and DEC. This feature supports the possible solvation of the electron, without attachment, in neat DEC.

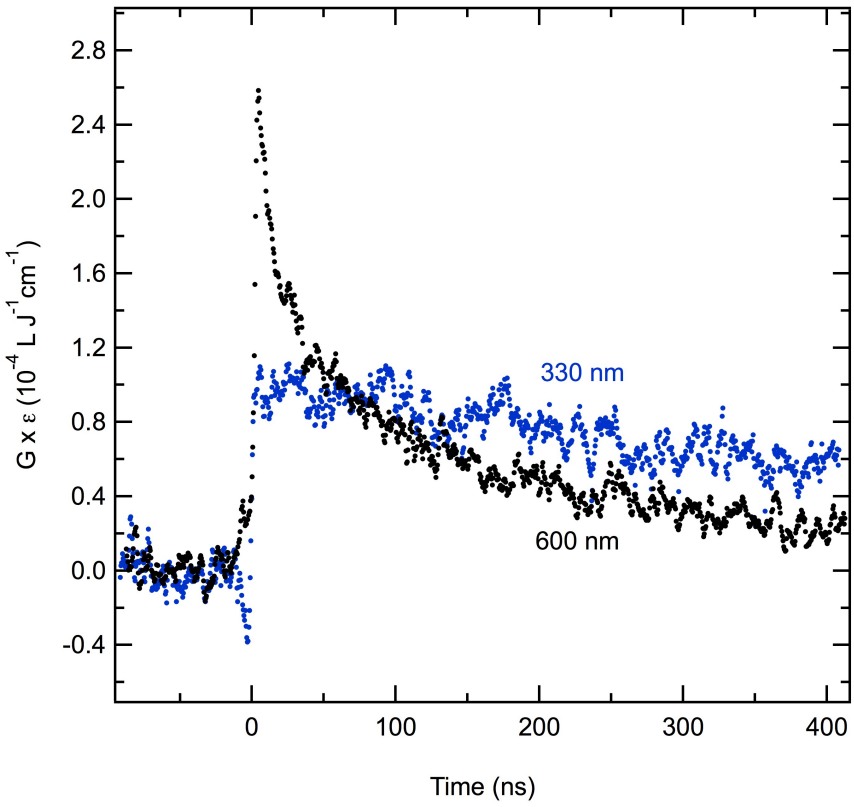

Figure S2. Comparison between the simultaneous decays at long time in neat DEC of the absorbances at 330 nm assigned to DEC(+H)$^{\cdot}$ and at 600 nm assigned to DEC(-H)$^{\cdot}$. Note that until 150 ns the absorbance at 600 nm contains in addition a component assigned to e_{DEC}^{-}. Streak camera detection. Optical path: 1 cm.

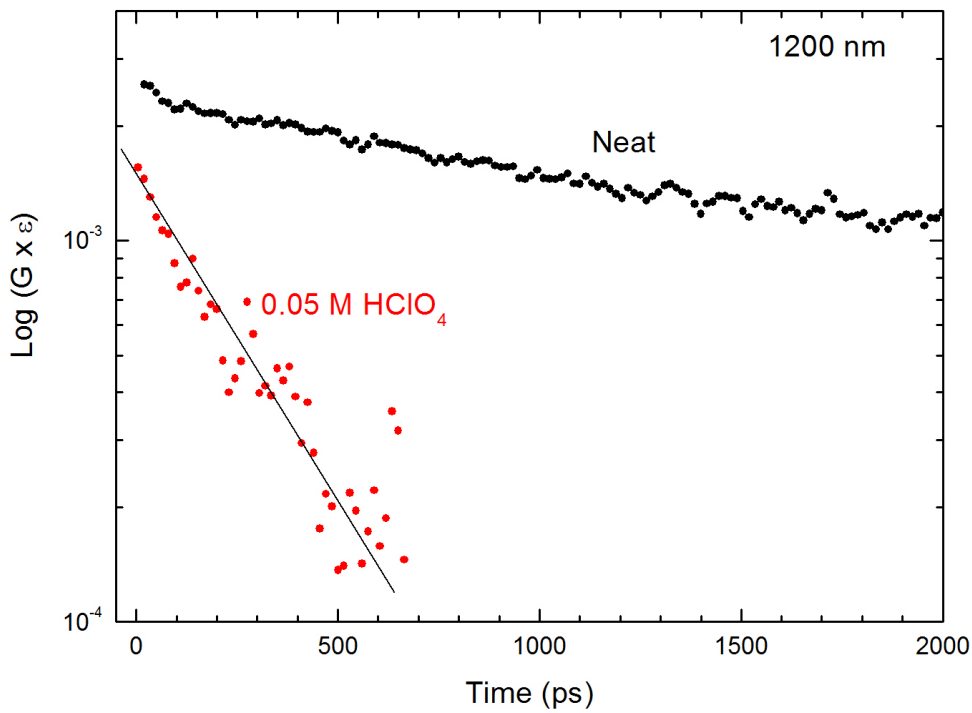

Figure S3. Pseudo-first order decay of solvated electron at 1200 nm in 5 × 10^{-2} mol L^{-1} $HClO_4$ solution compared to the decay in neat DEC.

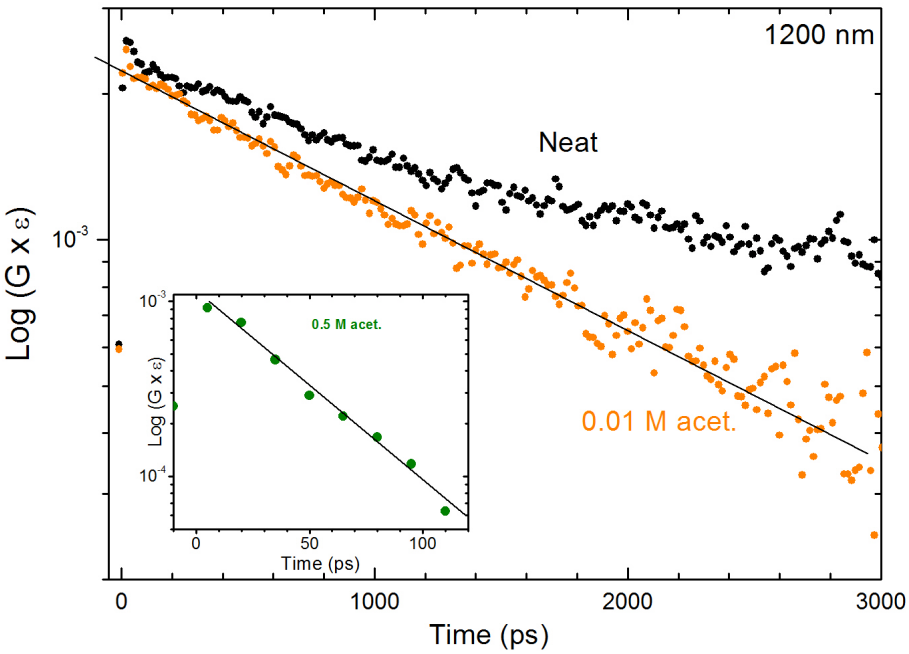

Figure S4. Pseudo-first order decay of solvated electron absorbance at 1200 nm in DEC solution with 10^{-2} mol L^{-1} acetone compared to the decay in neat DEC. Inset: Pseudo-first decay of solvated electron absorbance at 1200 nm in 0.5 mol L^{-1} acetone solution.

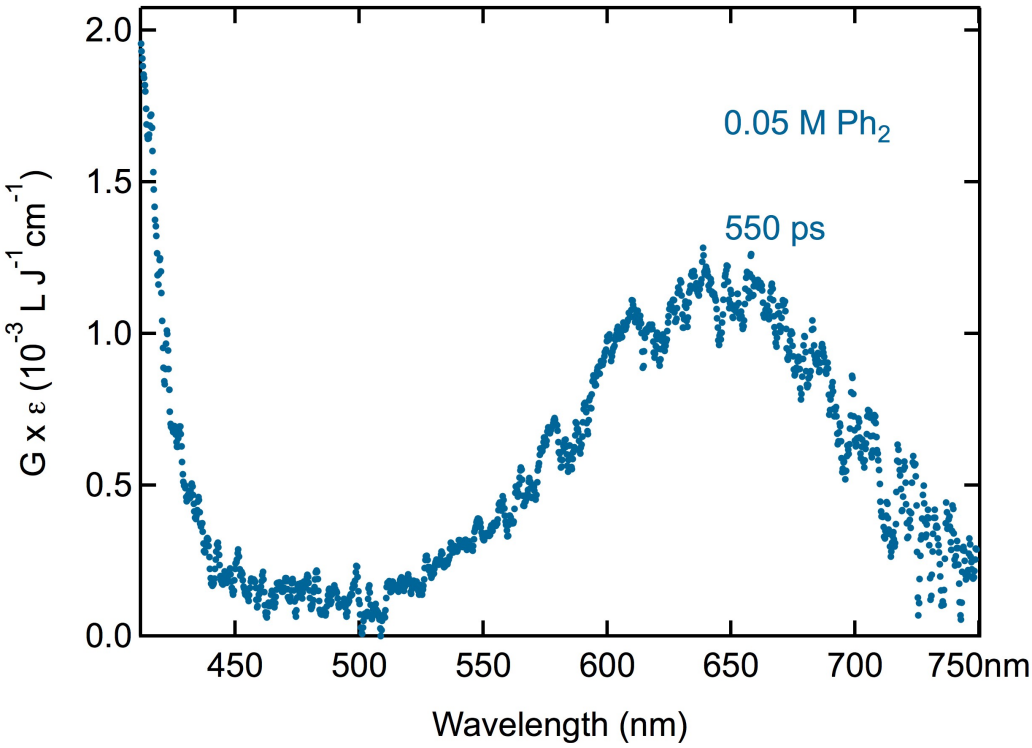

Figure S5. Transient optical absorption spectrum in DEC solutions with 5×10^{-2} mol L^{-1} biphenyl at 550 ps. It is constituted of the sum of two components, *i.e.* the intense spectrum of the $Ph_2^{-\cdot}$ anion radical and, for a small part, the spectrum of DEC(-H)$^{\cdot}$.

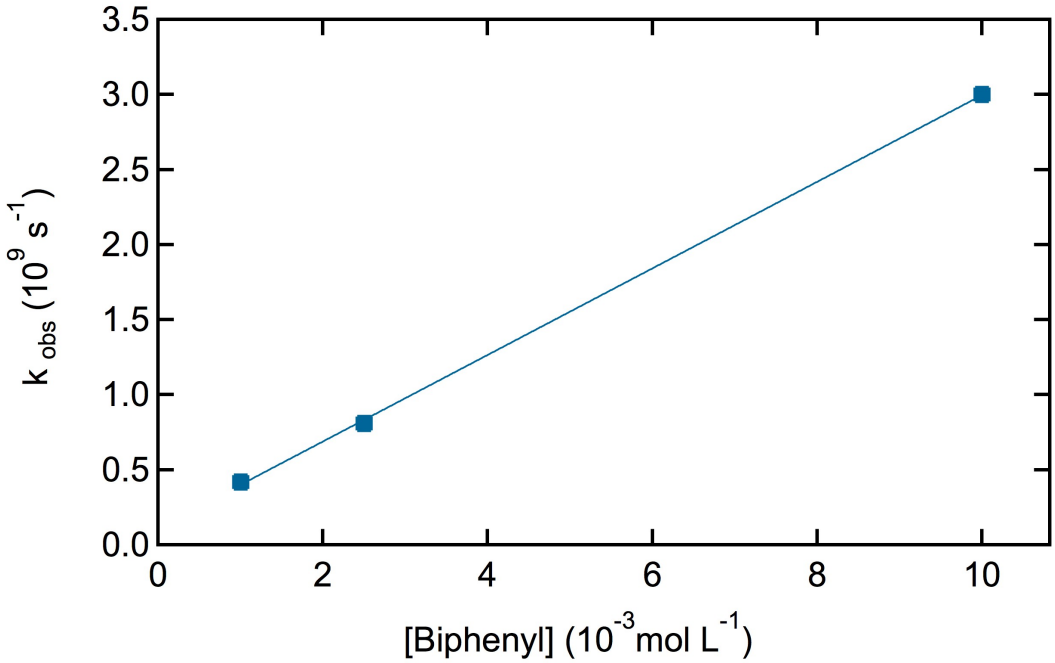

Figure S6. Variation of the observed pseudo-first-order rate constant of the $Ph_2^{-\cdot}$ formation in the scavenging reaction of solvated electrons by biphenyl *versus* the biphenyl concentration. Data of k_{obs} are obtained from the second-step increase of $Ph_2^{-\cdot}$ observed at 630 nm after the absorption of the radical DEC(-H)$^{\cdot}$ has been subtracted.

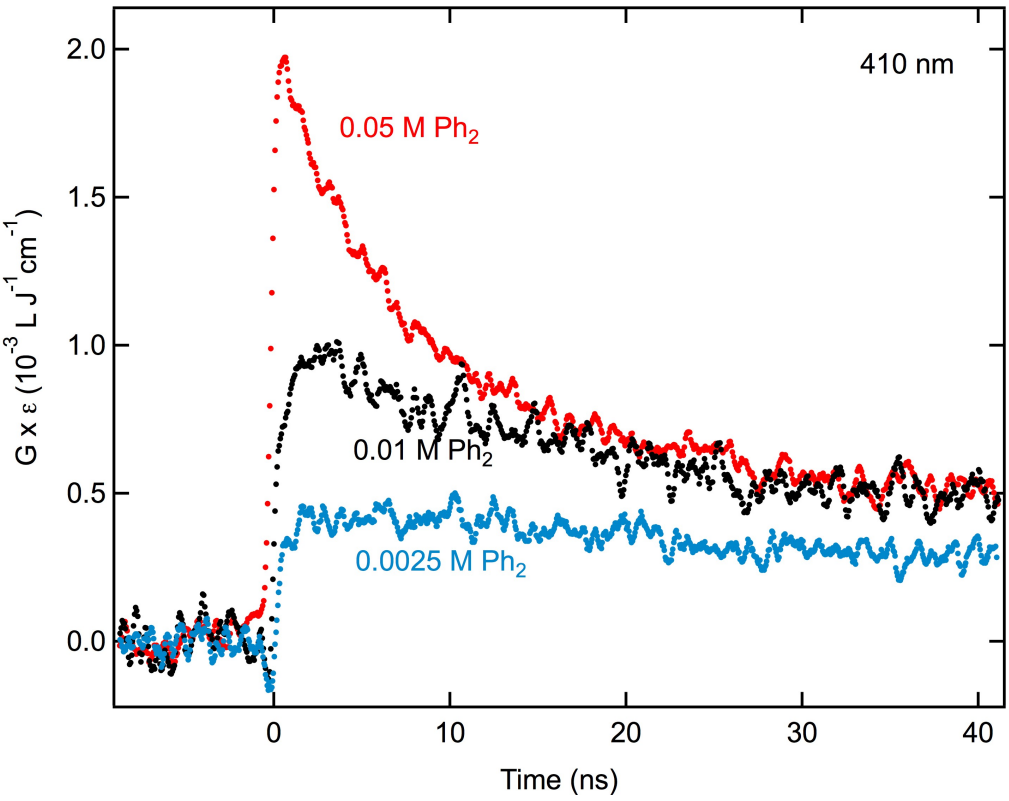

Figure S7. Formation and decay kinetics at 410 nm in DEC solutions of biphenyl at variable concentrations. Each signal is constituted of the sum of two components, that of the anion radical $PH_2^{-\cdot}$ and that of the radical DEC(-H)$^{\cdot}$. Pulse duration : 5 ps, dose : 50 J L^{-1}.

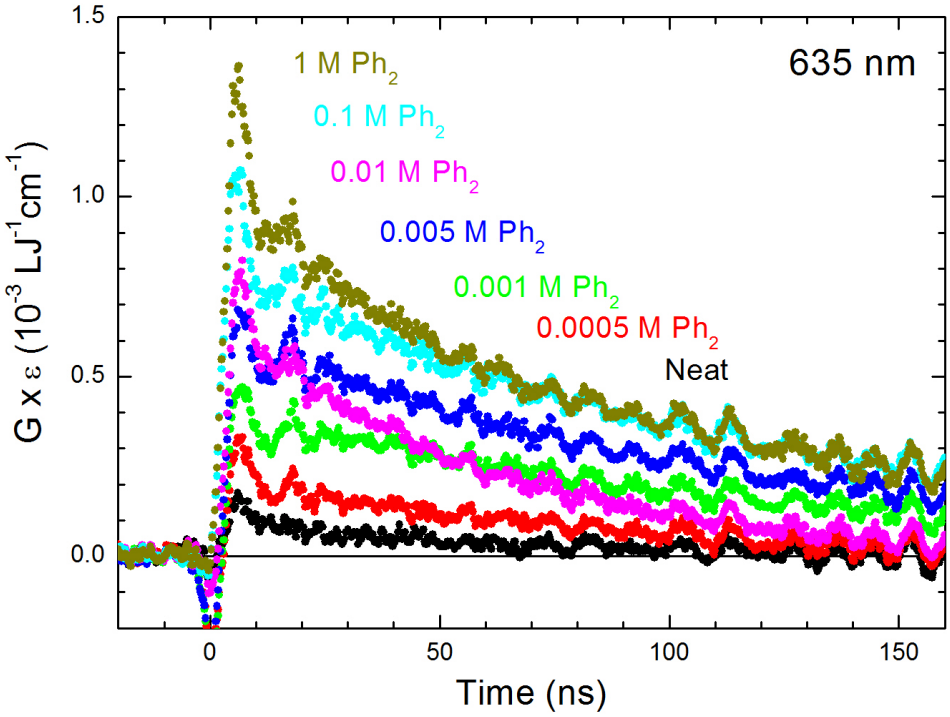

Figure S8. Decay kinetics at 635 nm in DEC solutions of biphenyl at variable concentrations. Each signal is constituted of the sum of two components, that of the anion radical $PH_2^{-\cdot}$ and that of the radical DEC(-H)$^{\cdot}$. Pulse duration : 5 ns, dose : 500 J L^{-1}.

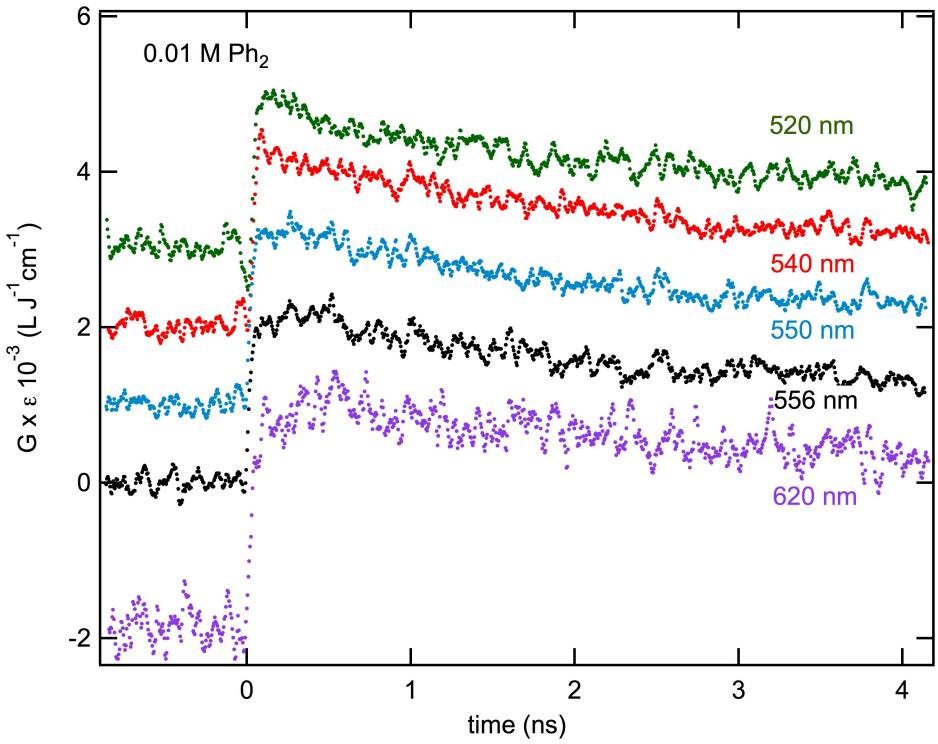

Figure S9. Time evolution of the absorbance at the biphenyl concentration in DEC of 10^{-2} mol L^{-1} close to the first isosbestic wavelength between the spectra of e_{DEC}^- and $Ph_2^{-\cdot}$ (540 nm). Note that, for clarity, the signals are shifted on the ordinates scale.

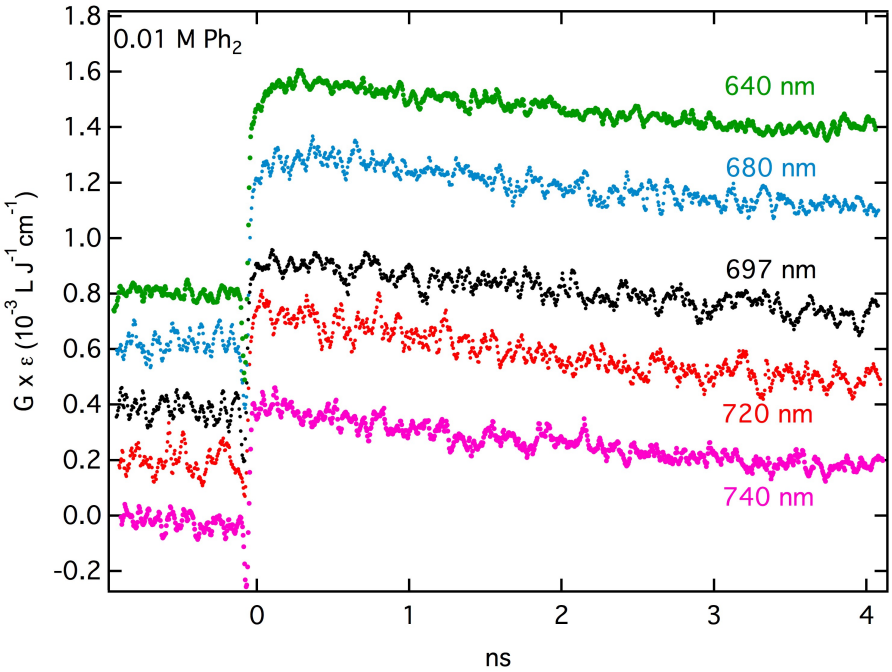

Figure S10. Time evolution of the absorbance at the biphenyl concentration in DEC of 10^{-2} mol L^{-1} close to the second isosbestic wavelength between the spectra of e_{DEC}^- and $Ph_2^{-\cdot}$ (720 nm). Note that, for clarity, the signals are shifted by 0.2 units on the ordinates scale.

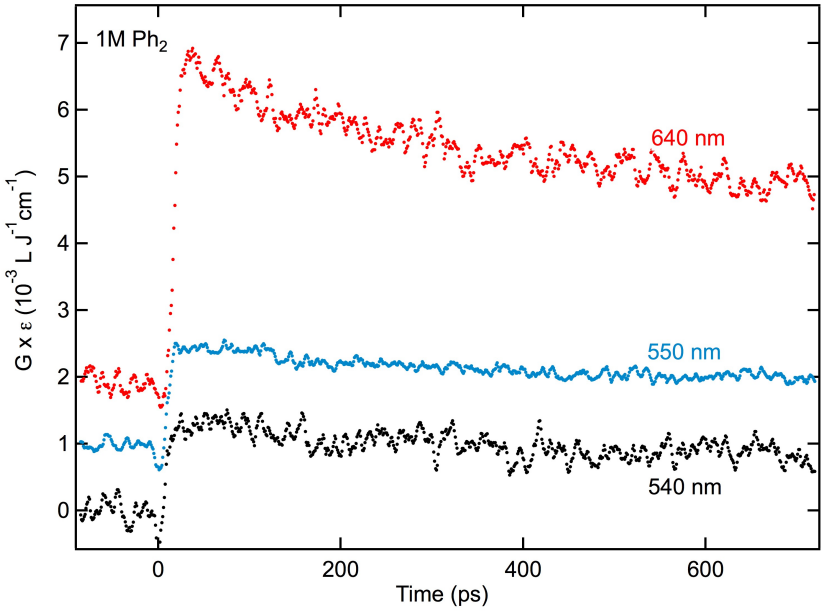

Figure S11. Time evolution of the absorbance at the biphenyl concentration in DEC of 1 mol L^{-1} close to the isosbestic wavelength between the spectra of e_{DEC}^- and $Ph_2^{-\cdot}$ (540 nm), and at the maximum wavelength of $Ph_2^{-\cdot}$ (640 nm). Shift by 0.1 unit on the ordinates scale.