

Supplementary Material for: Exciton dynamics in monolayer graphene grown on a Cu(111) surface

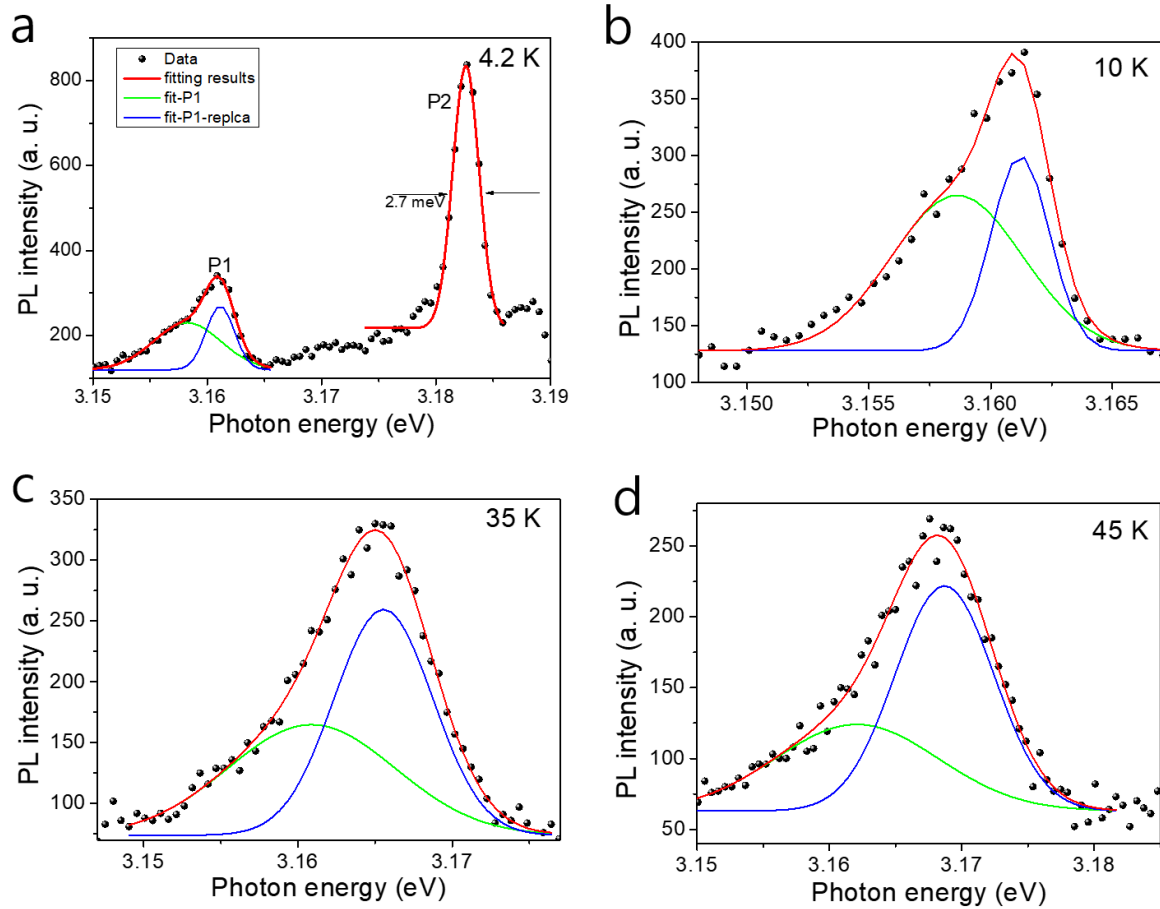
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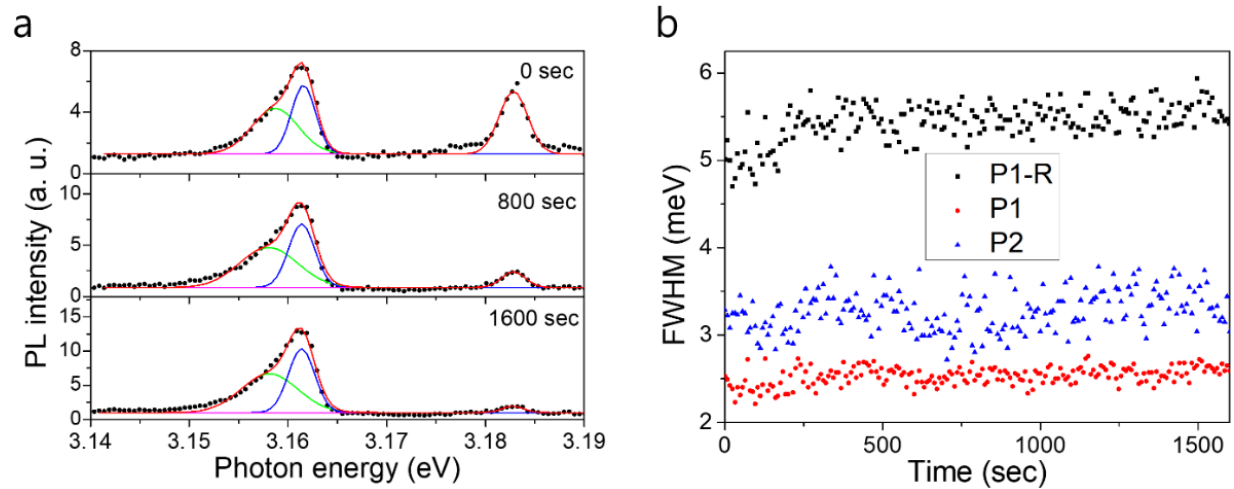
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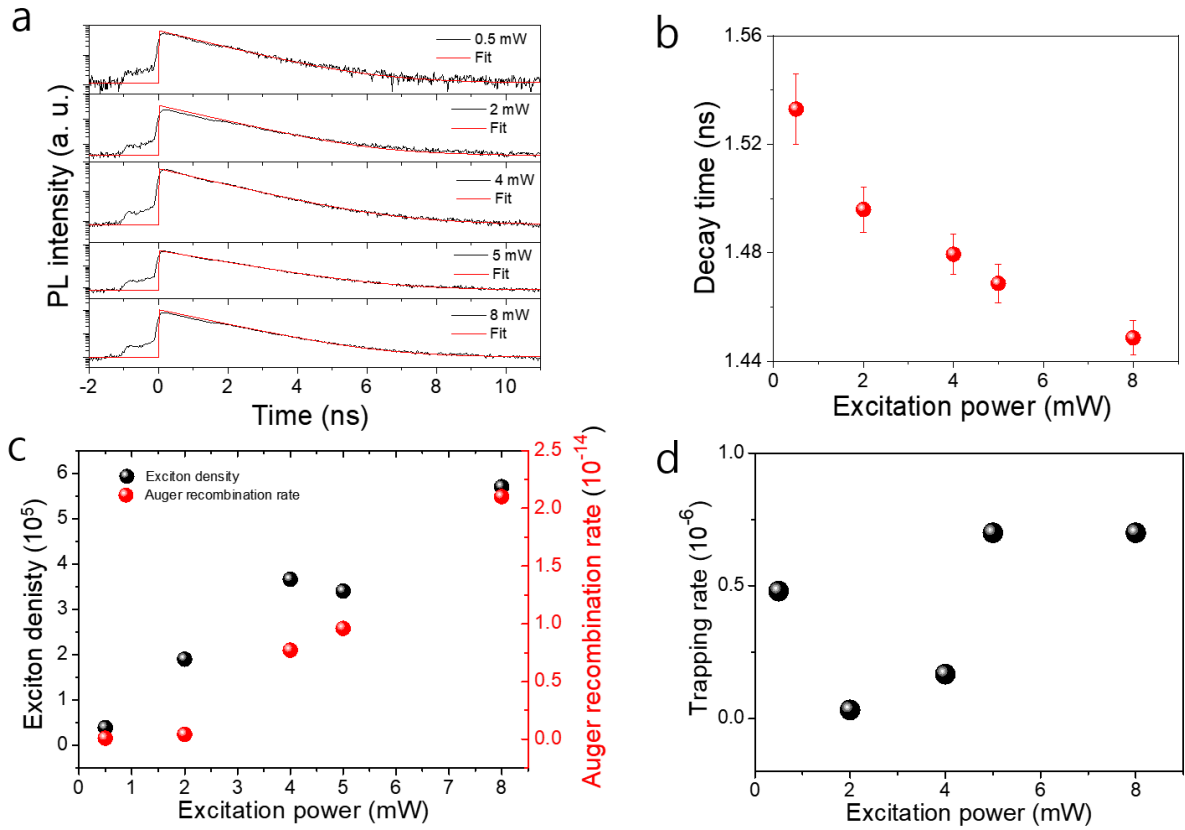
Supplementary Figures



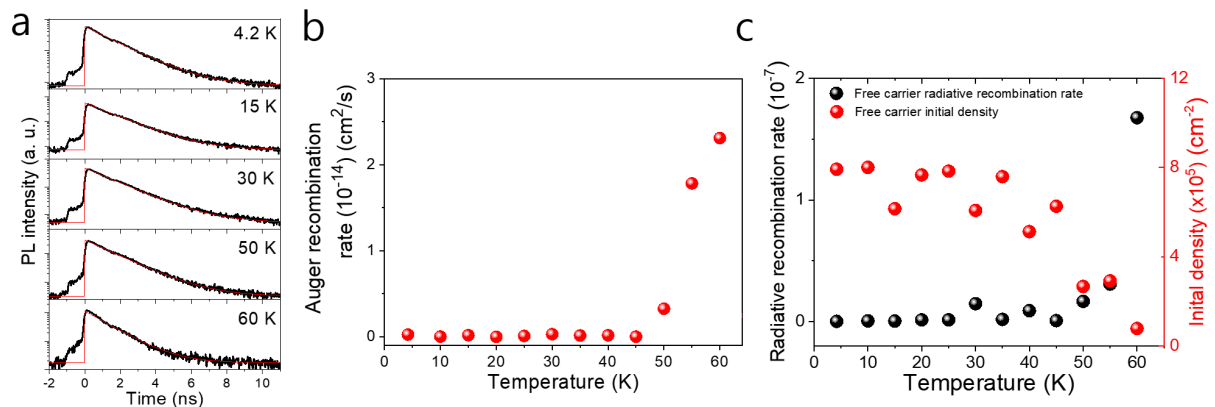
Supplementary Figure 1. Temperature-dependent PL spectra of graphene grown on a Cu(111) surface. The PL peaks were fitted by using a Gaussian function. Black dots are measured data. The red curves are the fitting results for the P1 and P2 peaks. The green and blue peaks are the individual fitted results for the P1 peak. **a** Fitting for the P1 and P2 peaks measured at 4.2 K. The P1 peak is fitted by two peaks, whilst the P2 peak is fitted by a single peak. **b~d** Fitting of the P1 peak measured at 10, 35, and 45 K, respectively.



Supplementary Figure 2 a The temporal variation of PL spectra from graphene and each peak is fitted. Black dots are measured data. The red curves are the fitting result. The green and blue peaks are the individual fitted results. **b** The full width at half maximum of the P1 and P2 peaks as a function of time.



Supplementary Figure 3 **a** TRPL curves of the P1 peak at different excitation powers. The red solid lines are fitted curves by the coupled rate equations. **b** The decay time as a function of excitation power. All the times were deduced by fitting. **c** Initial exciton density and Auger recombination rate as a function of excitation power. **d** Carrier trapping rate as a function of excitation power. The trapping rate is almost independent on excitation power.



Supplementary Figure 4 **a** TRPL curves for the P1 peak with different temperatures. The black and red lines are the data and fitting results. **b** Auger recombination rate as a function of temperature. **c** The initial free carrier density and its radiative recombination rate as a function of temperature.