Ont-pot facile decoration of CdSe quantum dots on graphene nanosheets: novel graphene-CdSe nanocomposites with tunable fluorescent property

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Preparation of precursors - Cadmium myristate.

Cadmium nitrate (5 mmol) was dissolved in anhydrous methanol (50mL). A sodium hexadecylic solution was prepared by dissolving sodium hydroxide (15 mmol) and hexadecylic acid (15 mmol) in anhydrous methanol (500 mL). Then, the cadmium-nitrate solution was added dropwise (one drop per second) into the sodium- hexadecylic solution with vigorous stirring. The resulting white precipitate was washed with methanol three times, and then dried at ~60 ^{o}C under vacuum overnight.

Measurement of fluorescence quantum yield.

The comparative method of Williams is used in this measurement. According to the following equation:

$$\Phi_X = \Phi_{ST}\left(\frac{Grad_X}{Grad_{ST}}\right)\left(\frac{\eta_X^2}{\eta_{ST}^2}\right)$$

Where the subscripts ST and X denote standard and test respectively, Φ is the fluorescence quantum yield, *Grad* the gradient from the plot of integrated fluorescence intensity *vs* absorbance, and η the refractive index of the solvent.

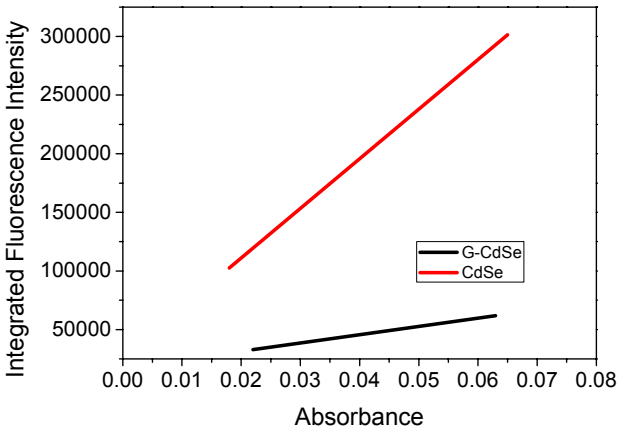

Fig. S1. The gradient of each sample's curve is proportional to the sample's fluorescence quantum yield.

The Fluorescence Quantum Yields of the G-CdSe is about 50% of that of the CdSe quantum dots.

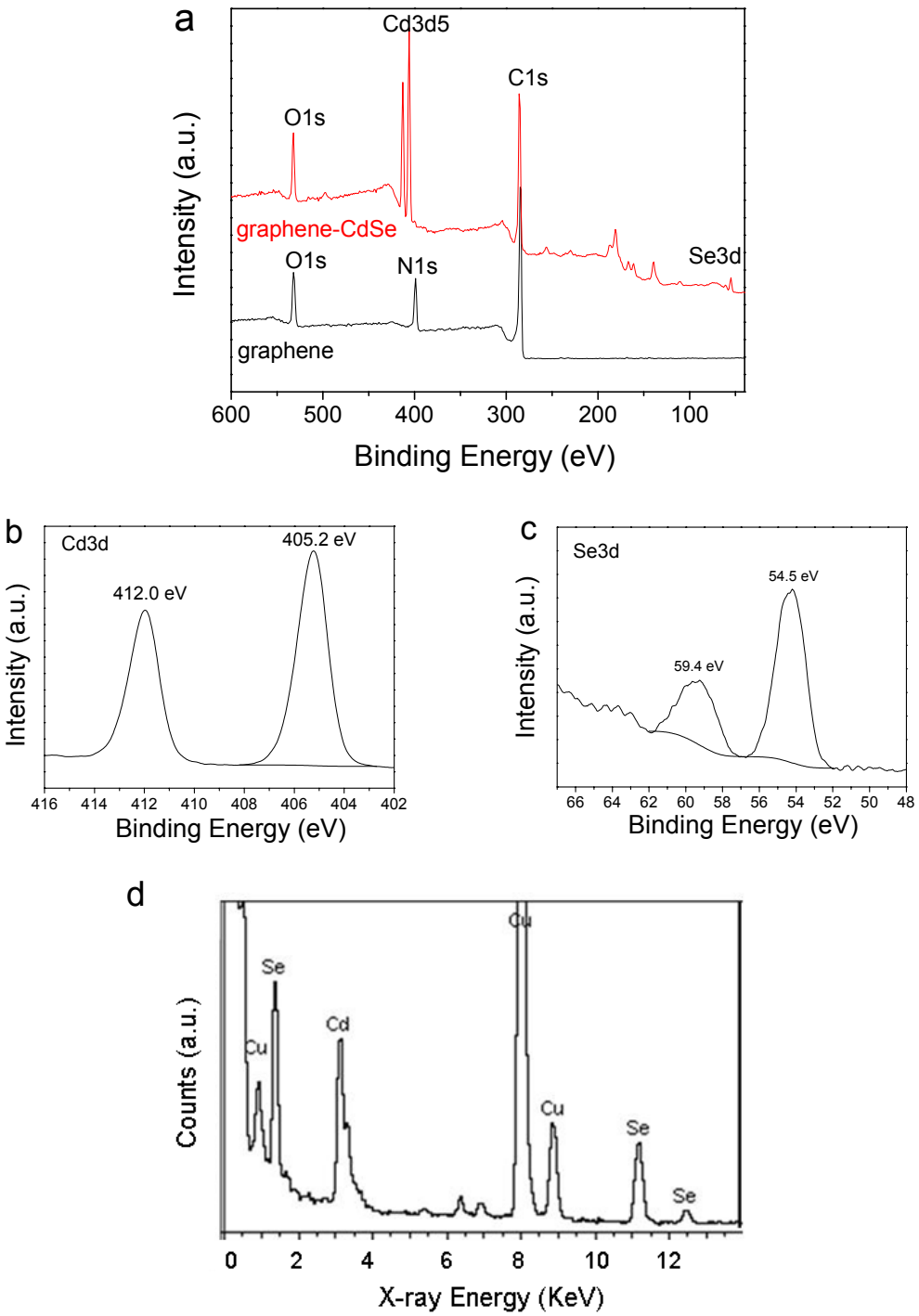

Fig. S2. (a) XPS spectra of the graphene and the G-CdSe. (b) XPS spectrum region of Cd3d and (c) XPS spectrum region of Se3d of the G-CdSe. (d) EDS spectrum of the G-CdSe nanocomposite.

Table S1. The detailed composition analysis on G-CdSe based on XPS data.

Name	Start BE	Peak BE	End BE	Height CPS	FWHM eV	Area (P) CPS.eV	Area (N) KE^1.0	At. %
C1s	290	284.79	282.5	50177.43	1.48	84929.88	0.4591	74.45
N1s	401.9	399.55	396.5	950.5	2.76	2219.06	0.0075	1.22
Cd3d5	408.2	405.23	402.7	65588.23	1.4	101347.98	0.0413	6.7
Se3d	56.95	54.19	51.95	3678.75	1.87	7200.78	0.0133	2.16
Se3d	62	59.2	57	1371.53	2.25	3190.94	0.0059	0.96
O1s	534.55	531.34	528.65	20404.96	1.69	38706	0.0894	14.51