† Electronic supplementary information (ESI)

Preparation of 3D graphene networks and C dots grafted graphene hybrid by new methods for improving photovoltaic performance of CdS/CdSe quantum dot sensitized solar cells

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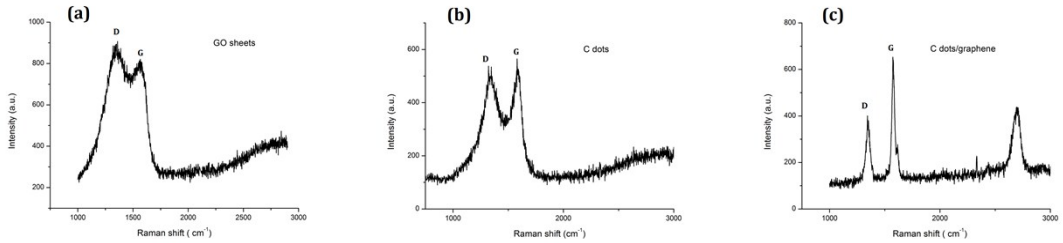

Fig. S1. (a) Raman spectrum of GO sheets, (b) Raman spectrum of C dots, (c) Raman spectrum of C dots/graphene hybrid.

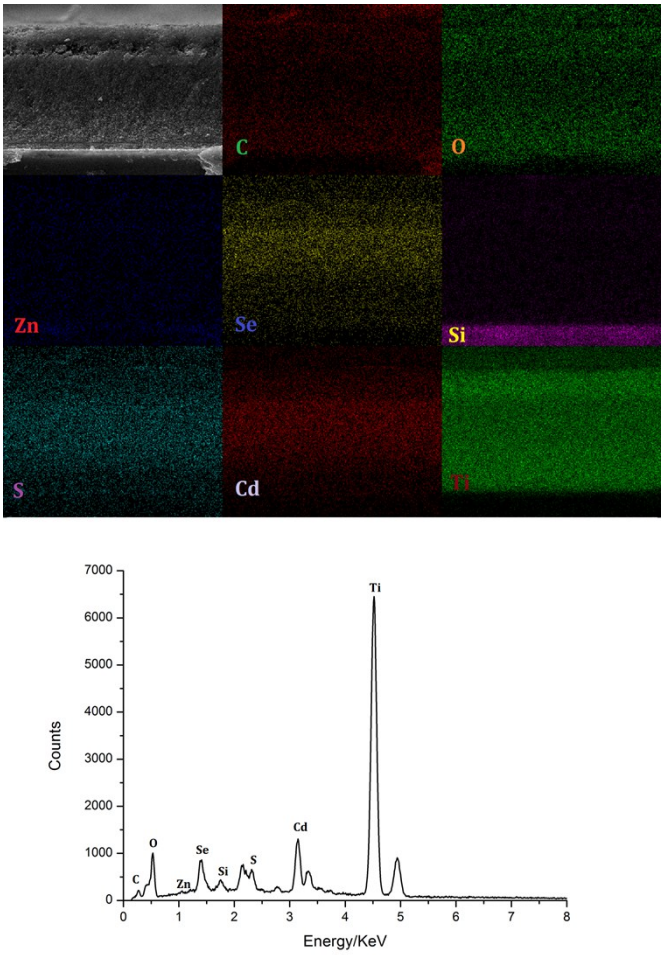

Fig. S2. The cross-section SEM image of the as-prepared CdS/CdSe sensitized CD-G/TiO_2 film and corresponding EDX elemental mapping.

Table. S1 Parameters for CdS/CdSe sensitized solar cells based on the different photoanodes with different CdS and CdSe cycles

Photoanode	J_{sc} (mA/cm^2)	V_{oc} (V)	FF (%)	η (%)
CdS(1c)/CdSe(1c)	4.21	0.401	0.42	0.71
CdS(2c)/CdSe(2c)	6.01	0.472	0.47	1.33
CdS(3c)/CdSe(3c)	7.34	0.498	0.48	1.75
CdS(4c)/CdSe(4c)	9.01	0.521	0.53	2.48
CdS(5c)/CdSe(5c)	10.14	0.543	0.58	3.24
CdS(6c)/CdSe(6c)	11.65	0.559	0.62	4.04
CdS(7c)/CdSe(7c)	11.36	0.558	0.61	3.87

Table. S2 Parameters for CdS/CdSe sensitized solar cells based on the different photoanodes with different GN contents

Photoanode	J_{sc} (mA/cm^2)	V_{oc} (V)	FF (%)	η (%)
0 wt% GN/TiO_2	11.65	0.559	0.62	4.04
0.4 wt% GN/TiO_2	11.96	0.576	0.61	4.20
0.8 wt% GN/TiO_2	12.18	0.575	0.61	4.27
1.2 wt% GN/TiO_2	12,51	0.577	0.60	4.33
1.6 wt% GN/TiO_2	12.62	0.578	0.60	4.37
2.0 wt% GN/TiO_2	12.03	0.576	0.59	4.08

Table. S3 Parameters for CdS/CdSe sensitized solar cells based on the different photoanodes with different CD-G contents

Photoanode	J_{sc} (mA/cm^2)	V_{oc} (V)	FF (%)	η (%)
0 wt% CD-G/TiO_2	11.65	0.559	0.62	4.04
0.4 wt% CD-G/TiO_2	12.17	0.575	0.61	4.27
0.8 wt% CD-G/TiO_2	12.50	0.576	0.60	4.32
1.2 wt% CD-G/TiO_2	12.95	0.577	0.60	4.48
1.6 wt% CD-G/TiO_2	13.49	0.579	0.59	4.60
2.0 wt% CD-G/TiO_2	13.71	0.580	0.59	4.69
2.4 wt% CD-G/TiO_2	12.43	0.576	0.58	4.15

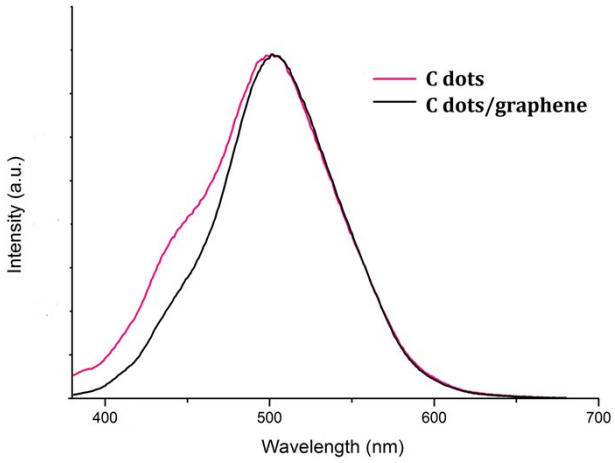

Fig. S3 Normalized the PL spectra on the dots and CD-G.

Fig. S3

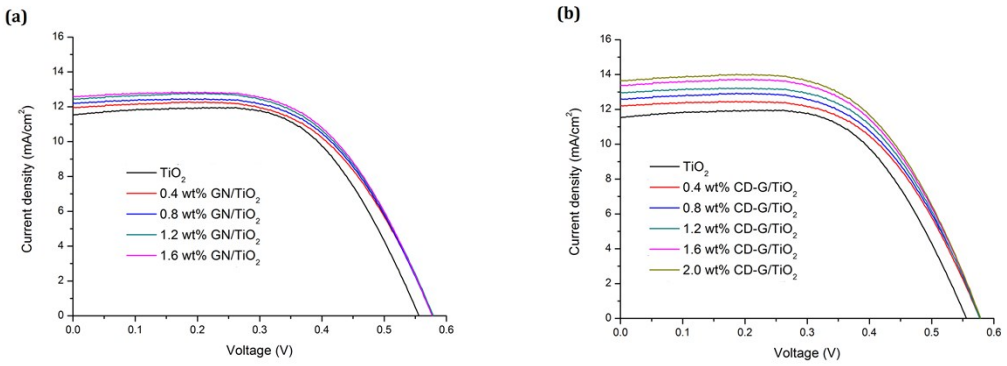

Fig. S4 *J-V* curves of CdS/CdSe QDSSCs based on different contents of GN or CD-G in TiO_2 photoanodes.