Electronic Supplementary Information (ESI)

Highly efficient and stable quasi-solid-state Quantum dot-sensitized solar cell based on superabsorbent polyelectrolyte

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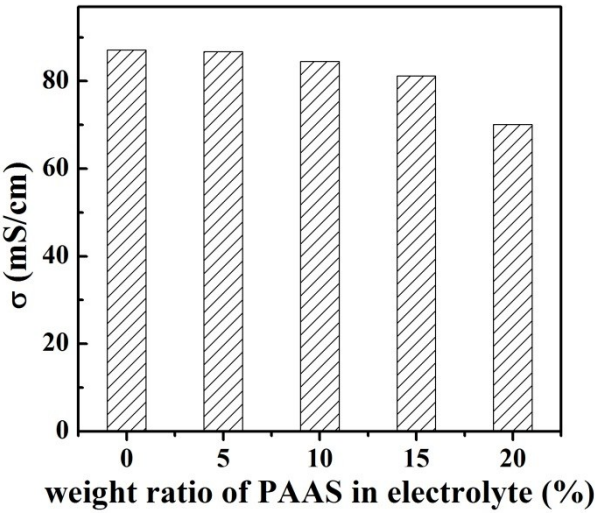

Fig. S1 Conductivity of electrolytes containing different weight ratio of PAAS with formula weight of 5000000 at 25°C.

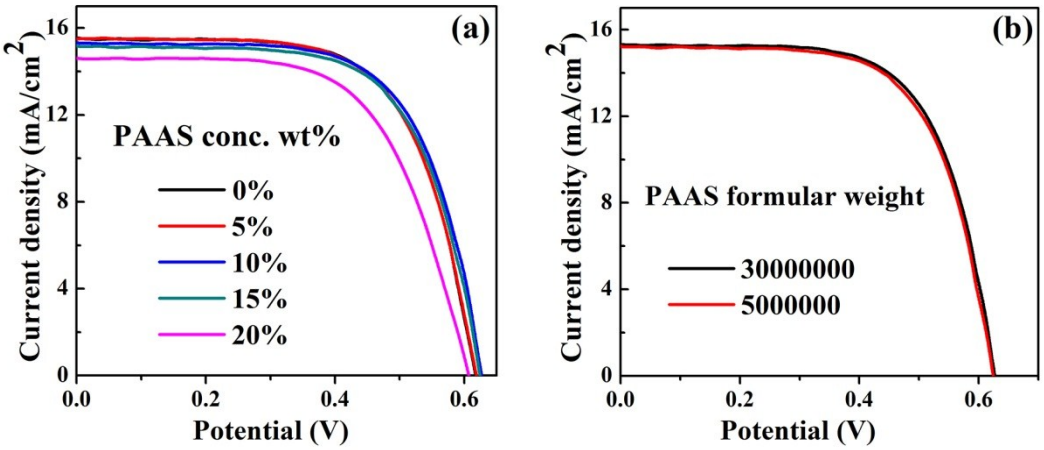

Fig. S2 (a) *J-V* curves of CdSe sensitized solar cells based on polysulfide electrolyte containing different weight ratio of PAAS with formula weight of 30000000. (b) *J-V* curves of CdSe QDSCs based on the gel electrolytes with 15 wt% PAAS of 5000000 and 30000000 formula weight.

Table S1 Photovoltaic parameters of CdSe sensitized solar cells based on the electrolytes containing different weight ratio of PAAS with 30000000 formula weight.

PAAS (wt%)	J_{sc} (mA·cm^{-2})	V_{oc} (V)	FF (%)	PCE (%)
Liquid	15.84(15.93)	0.618(0.623)	65.56(66.01)	6.42±0.045(6.55)
5%	15.81(15.79)	0.621(0.627)	65.79(66.11)	6.46±0.031(6.55)
10%	15.62(15.79)	0.626(0.626)	66.31(66.19)	6.48±0.076(6.54)
15%	15.54(15.63)	0.625(0.631)	66.22(66.27)	6.43±0.057(6.54)
20%	15.05(15.11)	0.609(0.615)	63.91(64.77)	5.86±0.086(6.02)

[a] Average parameters and standard deviation based on 5 solar cells in parallel. The numbers in parentheses represent the values obtained for the champion cells.

Table S2 Photovoltaic parameters of CdSe QDSCs based on gel electrolytes with 15 wt% PAAS of 5000000 and 30000000 formula weight.

PAAS (Fw)	J_{sc} (mA·cm^{-2})	V_{oc} (V)	FF (%)	PCE (%)
30000000	15.54(15.63)	0.625(0.631)	66.22(66.27)	6.43±0.057(6.54)
5000000	15.47(15.71)	0.623(0.629)	66.41(66.37)	6.40±0.072(6.56)

[a] Average parameters and standard deviation based on 5 cells in parallel. The numbers in parentheses represent the values obtained for the champion cells.

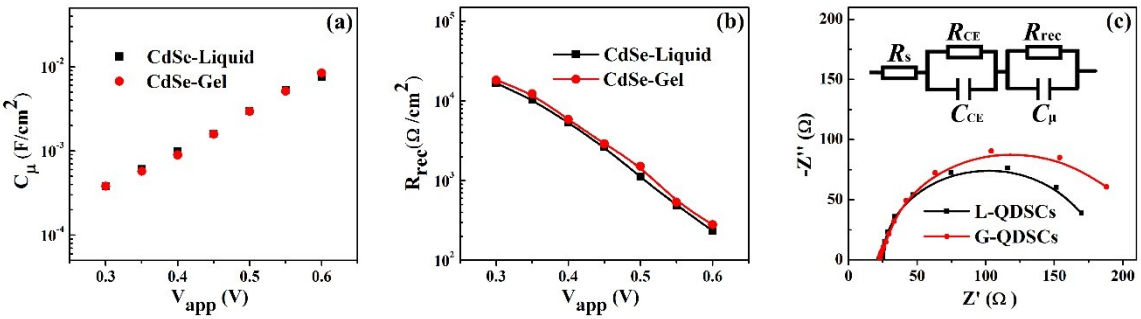

Fig. S3 EIS of CdSe sensitized L-QDSCs and G-QDSCs: (a) chemical capacitance C_μ; (b) recombination resistance R_{rec}; (c) Nyquist plots at –0.65 V forward bias (Inset: the equivalent circuit used to fit EIS).

Table S3 Simulated values of resistance (R) and capacitance (C) under the forward bias of –0.6 V of CdSe sensitized L- and G-QDSCs.

The cells	R_s ($\Omega \cdot cm^2$)	R_{CE} ($\Omega \cdot cm^2$)	R_{rec} ($\Omega \cdot cm^2$)	C_μ ($mF \cdot cm^{-2}$)	τ_n (ms)
L-QDSCs	22..85	5.41	217	7.6	1649.2
G-QDSCs	22.40	4.89	234	8.1	1895.4

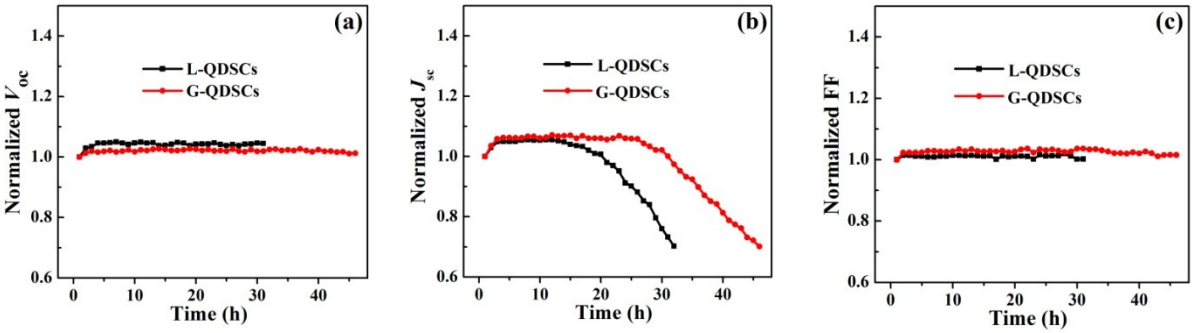

Fig. S4 Normalized V_{oc}, J_{sc} and FF variation of CdSeTe based L- and G-QDSCs under successive irradiation provided by an AM 1.5G solar simulator with intensity of 100 mW cm^{-2} at room condition.

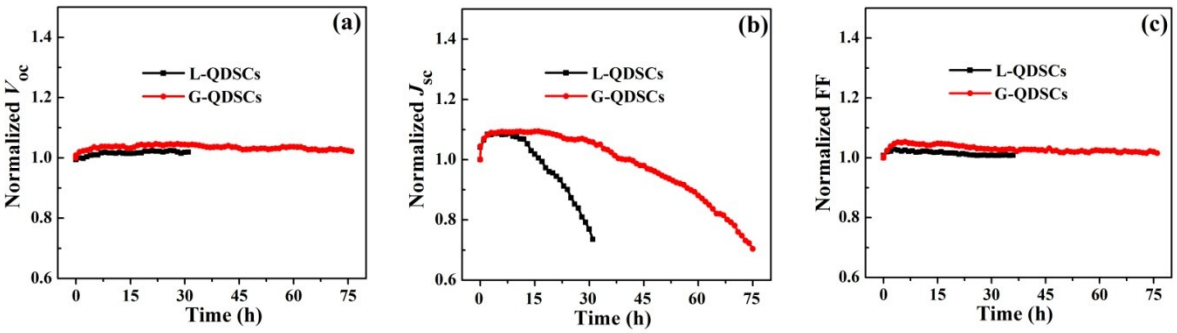

Fig. S5 Normalized V_{oc}, J_{sc} and FF variation of CdSe based L- and G-QDSCs under successive irradiation provided by an AM 1.5G solar simulator with intensity of 100 mW cm^{-2} at room condition.