

Supplementary Information (SI)

Origin of the effect of PEG additives in electrolyte on the performance of Quantum Dots Sensitized Solar Cells

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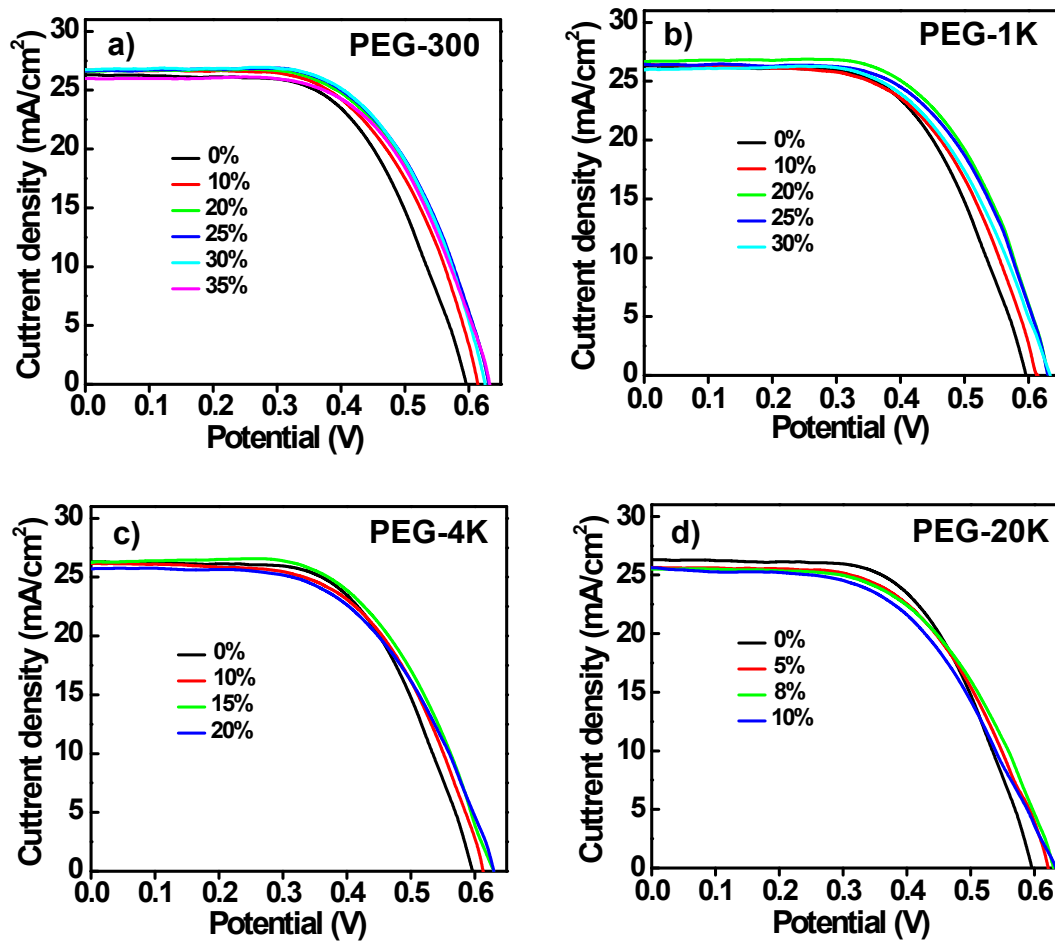


Fig. S1. J - V curves of ZCISE QDSCs corresponding to PEG additives with different concentrations: a) PEG-300, b) PEG-1K, c) PEG-4K, and d) PEG-20K, under the illumination of 1 full sun intensity (AM 1.5G, $100 \text{ mW}/\text{cm}^2$).

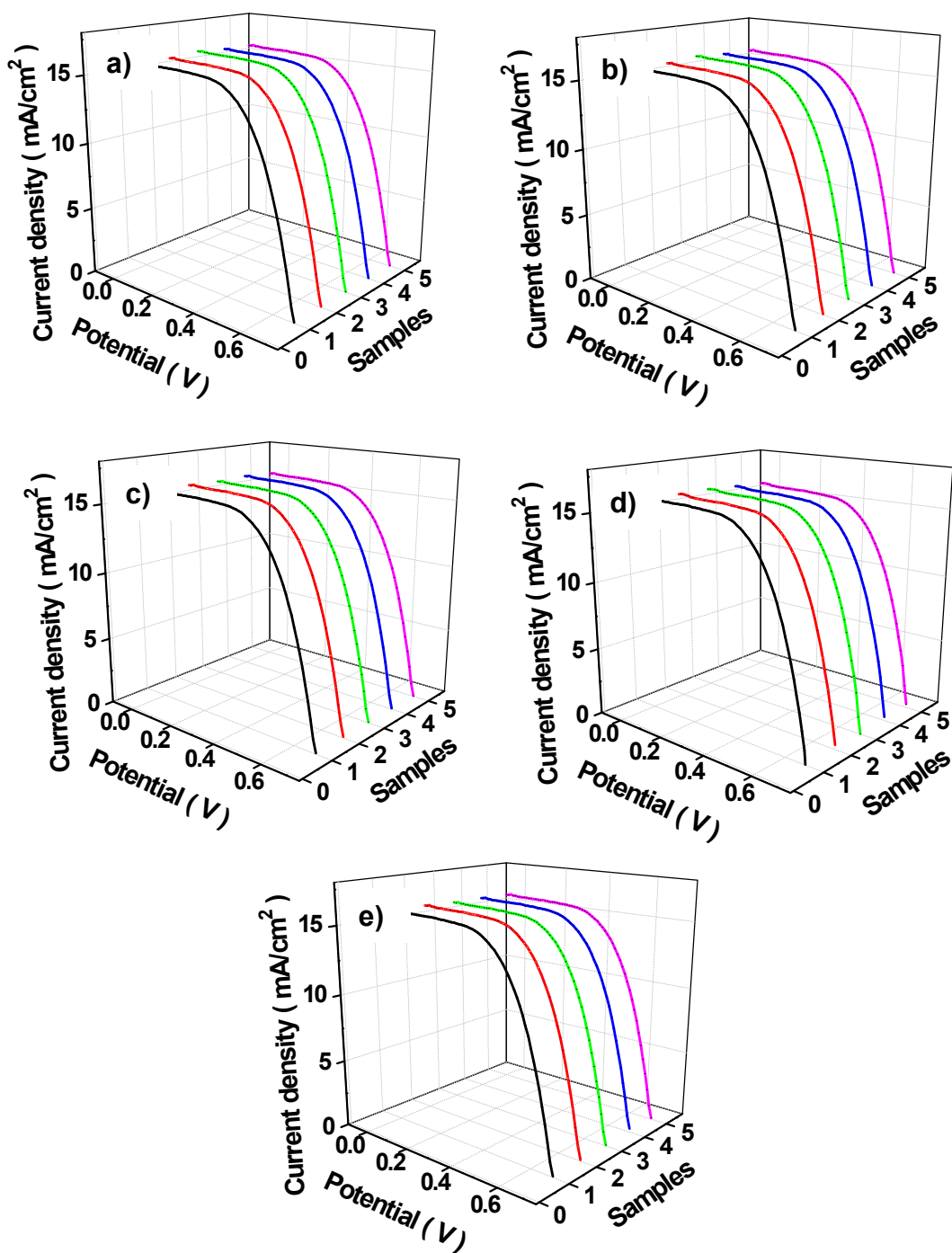


Fig. S2. J - V curves of CdSe QDSCs corresponding to polysulfide electrolyte containing various amount PEG-300 under the illumination of 1 full sun intensity (AM 1.5G, 100 mW/cm²).

Table S1. Photovoltaic performance of CdSe QDSCs with different PEG additives modified electrolyte under AM 1.5G illumination.

PEG additives	J_{sc} (mA·cm ⁻²)	V_{oc} (V)	FF (%)	PCE (%)
Ref	15.80	0.650	66.3	6.81
	15.90	0.653	65.8	6.83
	16.03	0.648	67.2	6.98
	15.70	0.660	65.5	6.79
	15.60	0.658	65.0	6.67
average	15.81 ± 0.17	0.654 ± 0.005	66 ± 0.8	6.81 ± 0.11
PEG-300	15.92	0.694	69.2	7.65
	15.71	0.685	68.5	7.37
	15.67	0.695	69.4	7.56
	15.78	0.678	71.2	7.62
	15.50	0.690	70.4	7.53
average	15.72 ± 0.15	0.688 ± 0.007	69.7 ± 1.1	7.54 ± 0.11
PEG-1K	16.05	0.692	68.2	7.57
	15.52	0.695	70.1	7.56
	15.93	0.682	70.2	7.63
	15.80	0.690	70.3	7.66
	15.70	0.694	69.4	7.56
average	15.8 ± 0.20	0.691 ± 0.005	69.6 ± 0.88	7.6 ± 0.05
PEG-4K	15.66	0.688	69.3	7.46
	16.00	0.679	68.5	7.47
	15.82	0.680	68.8	7.40
	15.87	0.688	67.9	7.46
	15.85	0.689	69.4	7.50
average	15.84 ± 0.12	0.685 ± 0.005	68.8 ± 0.6	7.50 ± 0.04
PEG-20K	15.56	0.692	68.9	7.46
	16.04	0.678	68.2	7.45
	15.84	0.682	68.3	7.43
	15.79	0.690	67.9	7.40
	15.90	0.685	68.3	7.58
average	15.83 ± 0.17	0.685 ± 0.0057	68.3 ± 0.36	7.38 ± 0.068

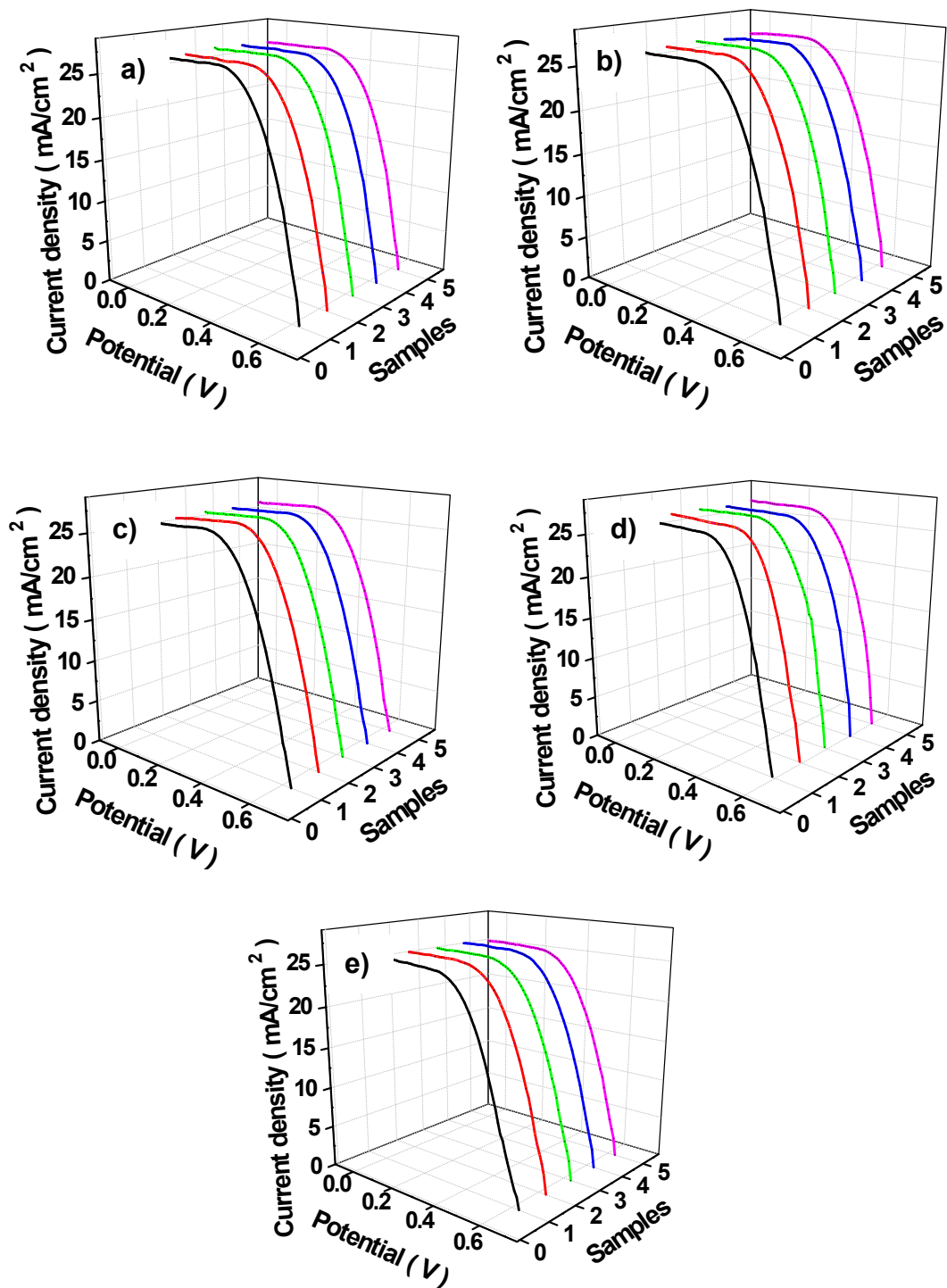


Fig. S3. J - V curves of ZCISe QDSCs corresponding to different PEG additives: a) Ref, b) PEG-300, c) PEG-1K, d) PEG-4K, and f) PEG-20K, modified polysulfide electrolyte under the illumination of 1 full sun intensity (AM 1.5G, 100 mW/cm²):

Table S2. Photovoltaic performance of ZCISe QDSCs with different PEG additives modified electrolyte under AM 1.5G illumination.

PEG additives	J_{sc} (mA·cm ⁻²)	V_{oc} (V)	FF (%)	PCE (%)
Ref	26.80	0.590	58.3	9.22
	26.42	0.593	59.8	9.37
	26.23	0.598	58.2	9.13
	26.70	0.588	59.5	9.34
	26.60	0.588	59.0	9.23
average	26.55±0.23	0.591±0.004	58.96±0.7	9.26±0.10
PEG-300	26.82	0.633	60.2	10.22
	26.61	0.626	60.5	10.08
	26.37	0.627	61.4	10.15
	26.68	0.628	61.2	10.25
	26.43	0.630	62.0	10.32
average	26.58±0.18	0.629±0.003	61.06±0.7	10.20±0.09
PEG-1K	26.14	0.632	61.0	10.08
	26.62	0.625	61.1	10.17
	26.83	0.628	60.2	10.14
	26.71	0.630	60.3	10.15
	26.52	0.624	61.6	10.19
average	26.56±0.26	0.628±0.003	60.8±0.6	10.15±0.04
PEG-4K	25.99	0.634	58.1	9.68
	25.91	0.633	59.0	9.61
	26.02	0.626	58.9	9.60
	26.00	0.628	58.7	9.59
	26.24	0.630	58.2	9.62
average	26.03±0.12	0.630±0.003	58.6±0.4	9.62±0.03
PEG-20K	25.56	0.632	56.3	9.09
	25.74	0.628	55.5	8.97
	25.84	0.632	56.8	9.28
	25.79	0.625	56.9	9.17
	24.82	0.635	57.4	9.05
average	25.55±0.42	0.630±0.004	56.6±0.7	9.11±0.12

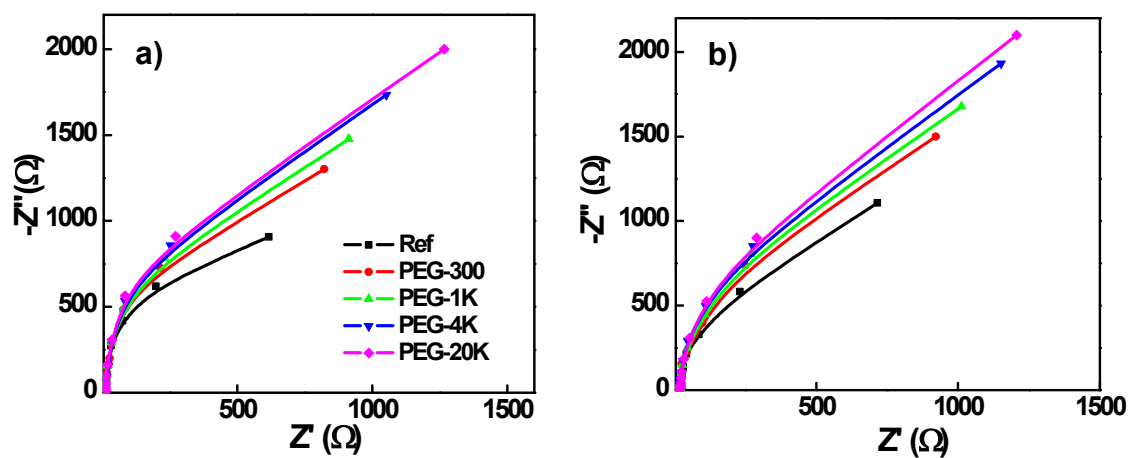


Fig. S4. Electrochemical characterizations of Nyquist plots under forward bias of -0.35 V for QDSCs corresponding to electrolyte containing different PEG additives: (a) CdSe QDSCs, (b) ZCISe QDSCs.

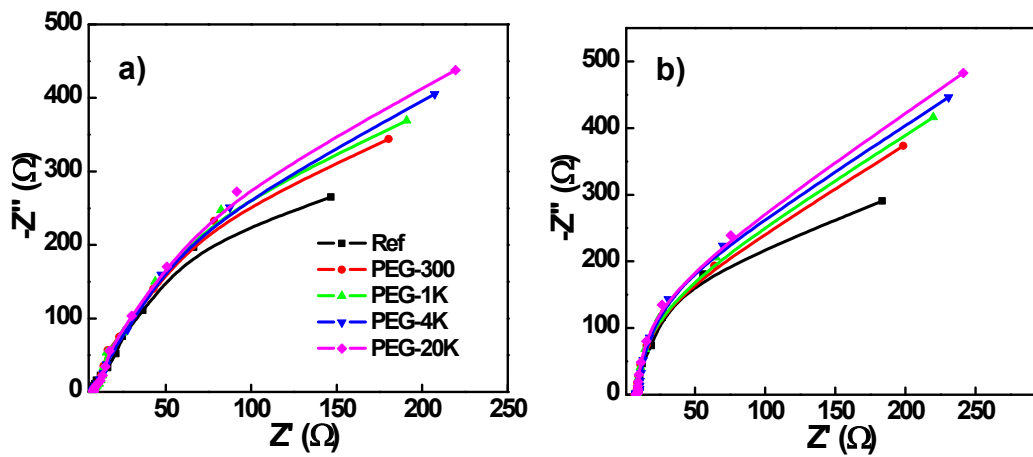


Fig. S5. Electrochemical characterizations of Nyquist plots under forward bias of -0.45 V for QDSCs corresponding to electrolyte containing different PEG additives: (a) CdSe QDSCs, (b) ZCISe QDSCs.

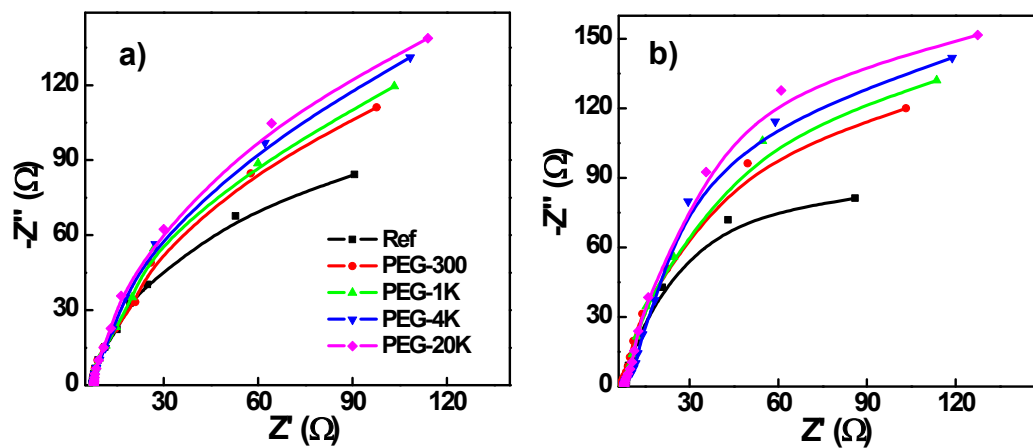


Fig. S6. Electrochemical characterizations of Nyquist plots under forward bias of -0.55 V for QDSCs corresponding to electrolyte containing different PEG additives: (a) CdSe QDSCs, (b) ZCISe QDSCs.