

Supporting Information

Inorganic Ligand Thiosulfate Capped Quantum Dots for Efficient Quantum Dot Sensitized Solar Cells

Zhenwei Ren,^{†,‡} Juan Yu,[†] Zhenxiao Pan,^{*,‡} Jizheng Wang,^{*,§} and Xinhua Zhong^{*,†,‡}

[†]Key Laboratory for Advanced Materials, School of Chemistry and Molecular Engineering, East China University of Science and Technology, Shanghai 200237, China E-mail: zhongxh@ecust.edu.cn.

[‡]College of Materials and Energy, South China Agricultural University, 483 Wushan Road, Guangzhou 510642, China E-mail: zxpan@scau.edu.cn.; zhongxh@ecust.edu.cn.

[§]Key Laboratory of Organic Solids, Institute of Chemistry Chinese Academy of Sciences, Beijing 100190, China E-mail: jizheng@iccas.ac.cn.

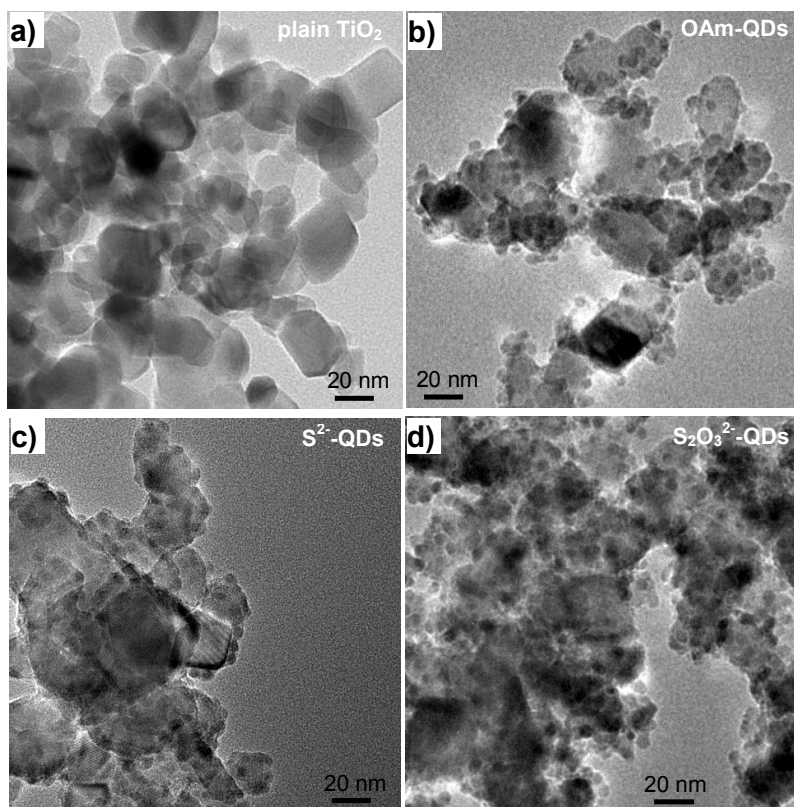


Figure S1. TEM images of (a) plain TiO₂, (b) OAm, (c) S²⁻, and (d) S₂O₃²⁻ capped CdSe QDs sensitized TiO₂ films.

Table S1. Photovoltaic parameters of the OAm, S²⁻ and S₂O₃²⁻ ligands capped CdSe QD based QDSCs under the illumination of 1 full sun intensity (AM 1.5G, 100 mW/cm²)

Sensitizers	J_{sc} (mA·cm ⁻²)	V_{oc} (V)	FF	PCE (%)
OAm-QDs	2.96	0.486	0.544	0.78
	3.25	0.489	0.550	0.87
	3.63	0.491	0.554	0.99
	3.01	0.487	0.548	0.80
	2.76	0.483	0.552	0.74
Average	3.12±0.33	0.487±0.003	0.550±0.004	0.84±0.10
S ²⁻ -QDs	9.42	0.593	0.632	3.53
	9.11	0.597	0.604	3.28
	9.03	0.592	0.63	3.37
	8.64	0.595	0.624	3.21
	9.28	0.596	0.619	3.42
Average	9.10±0.30	0.595±0.002	0.622±0.011	3.36±0.12
S ₂ O ₃ ²⁻ -QDs	15.76	0.623	0.622	6.11
	15.36	0.616	0.637	6.03
	15.68	0.615	0.644	6.21
	15.72	0.618	0.632	6.14
	15.81	0.62	0.619	6.07
Average	15.67±0.18	0.618±0.003	0.631±0.010	6.11±0.07

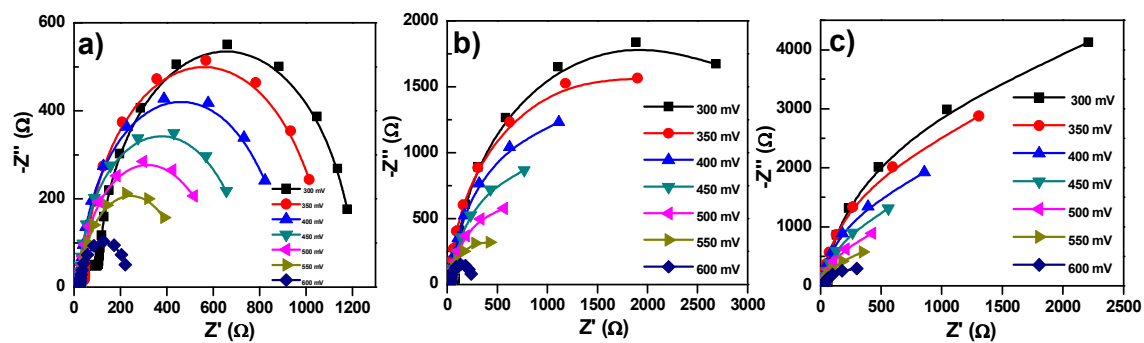


Figure S2. The detailed Nyquist curves of (a) OAm-QDs, (b) S^{2-} -QDs, and (c) $S_2O_3^{2-}$ -QDs sensitized devices at different forward biases under dark conditions.

Table S2. Impedance values at a -0.6 V forward bias for OAm, S²⁻ and S₂O₃²⁻ ligands capped CdSe based cells, series resistance R_s , counter electrode charge transfer resistance R_{CE} , recombination resistance R_{rec} , chemical capacitance C_{μ} , and electron lifetime $\tau_n = R_{rec} \cdot C_{\mu}$.

Sensitizers	R_s $\Omega \cdot \text{cm}^2$	R_{CE} $\Omega \cdot \text{cm}^2$	R_{rec} $\Omega \cdot \text{cm}^2$	C_{μ} $\text{mF} \cdot \text{cm}^{-2}$	τ_n s
OAm-QDs	22.56	5.65	206.5	2.33	0.48
S ²⁻ -QDs	20.07	11.11	350.4	2.56	0.89
S ₂ O ₃ ²⁻ -QDs	21.22	10.16	588.7	2.96	1.74