Bifacial dye−sensitized solar cells with enhanced rear efficiency and power output

Hongyuan Cai[a,b], Qunwei Tang[a,b]*, Benlin He[b], Ru Li[a], Liangmin Yu[a,c]*

[a] Key Laboratory of Marine Chemistry Theory and Technology, Ministry of Education, Ocean University of China, Qingdao266100, P.R. China;

[b] Institute of Materials Science and Engineering, Ocean University of China, Qingdao266100, P.R. China;

[c] Qingdao Colobrative Innovation Center of Marine Science and Technology, Ocean University of China, Qingdao 266100, P.R. China;

*E−mail address: tangqunwei@ouc.edu.cn, yuyan@ouc.edu.cn, Tel/Fax: 86 532 66781690;

Supplementary table and figures

Table S1 Output EIS parameters of the symmetric dummy cells employing various CEs. R_s: series resistance; R_{ct}: charge−transfer resistance; CPE: corresponding chemical capacitance; W: Nerst diffusion resistance; τ: lifetime of electrons in anode.

CEs	R_s (Ω cm^2)	R_{ct} (Ω cm^2)	W (Ω cm^2)	τ (μs)
Ru_2Se	10.60	5.40	5.73	28.17
RuSe	9.38	5.08	6.30	19.88
$Ru_{0.5}Se$	2.49	2.88	1.01	13.03
$Ru_{0.33}Se$	3.18	2.77	0.93	8.94
$Ru_{0.25}Se$	10.49	2.98	1.75	14.62
$Ru_{0.2}Se$	9.48	4.68	2.58	17.65
Se	9.81	154.90	4.90	93.18
Ru	15.32	893.30	7245	9947.18
Pt	20.77	7.23	0.83	85.11

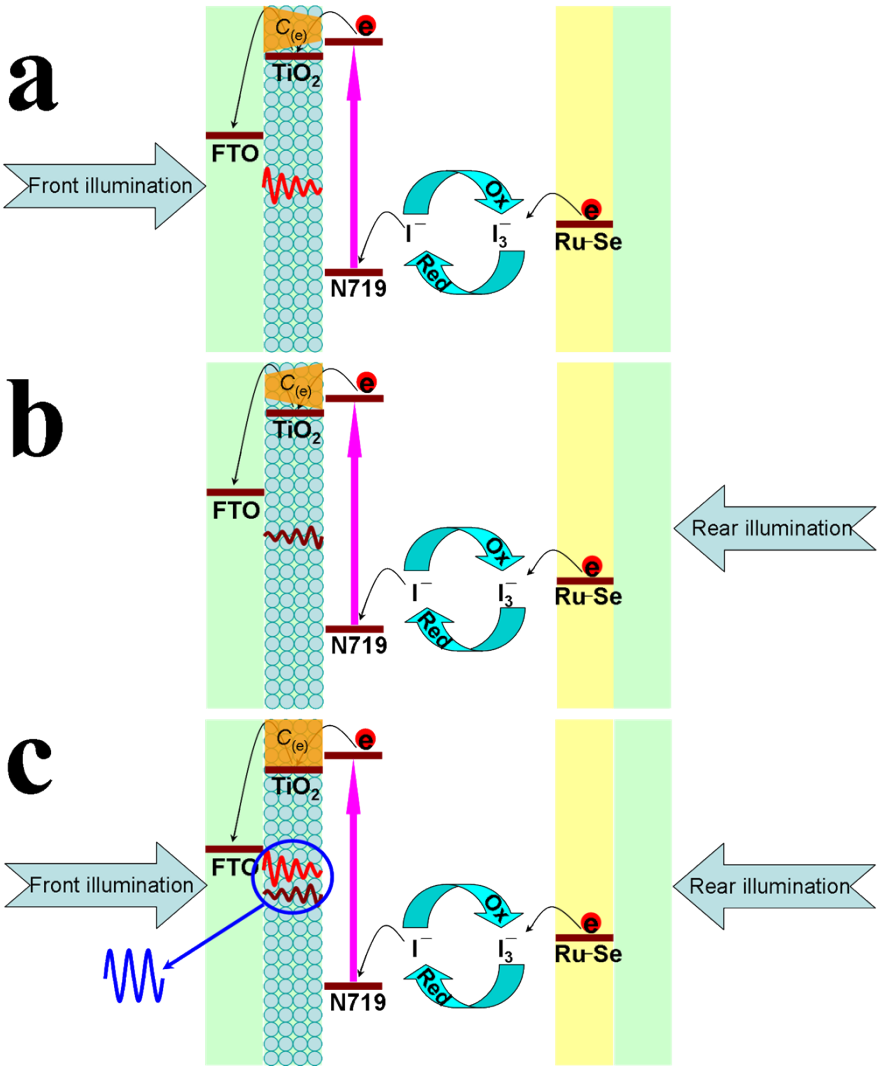

Fig. S1 Schemes representing incident light descent and electron density on conduction band of TiO_2 with irradiation from (a) front, (b) rear, and (c) both. The incident light intensity is controlled at 100 mW cm^{-2} (calibrated by a standard silicon solar cell) in either side.

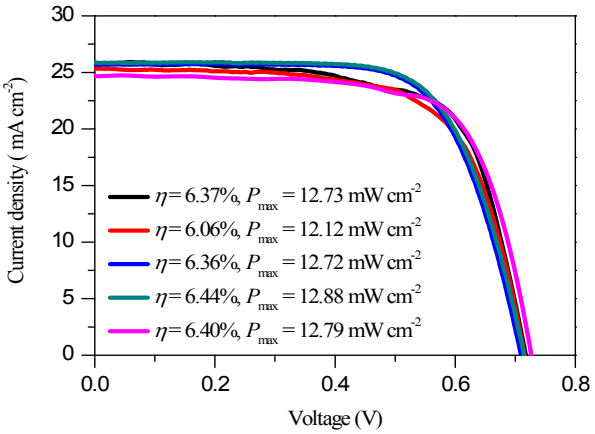

Fig. S2 Repeated characteristic $J-V$ curves of the DSSCs employing $Ru_{0.33}Se$ alloy CE for both irradiation.

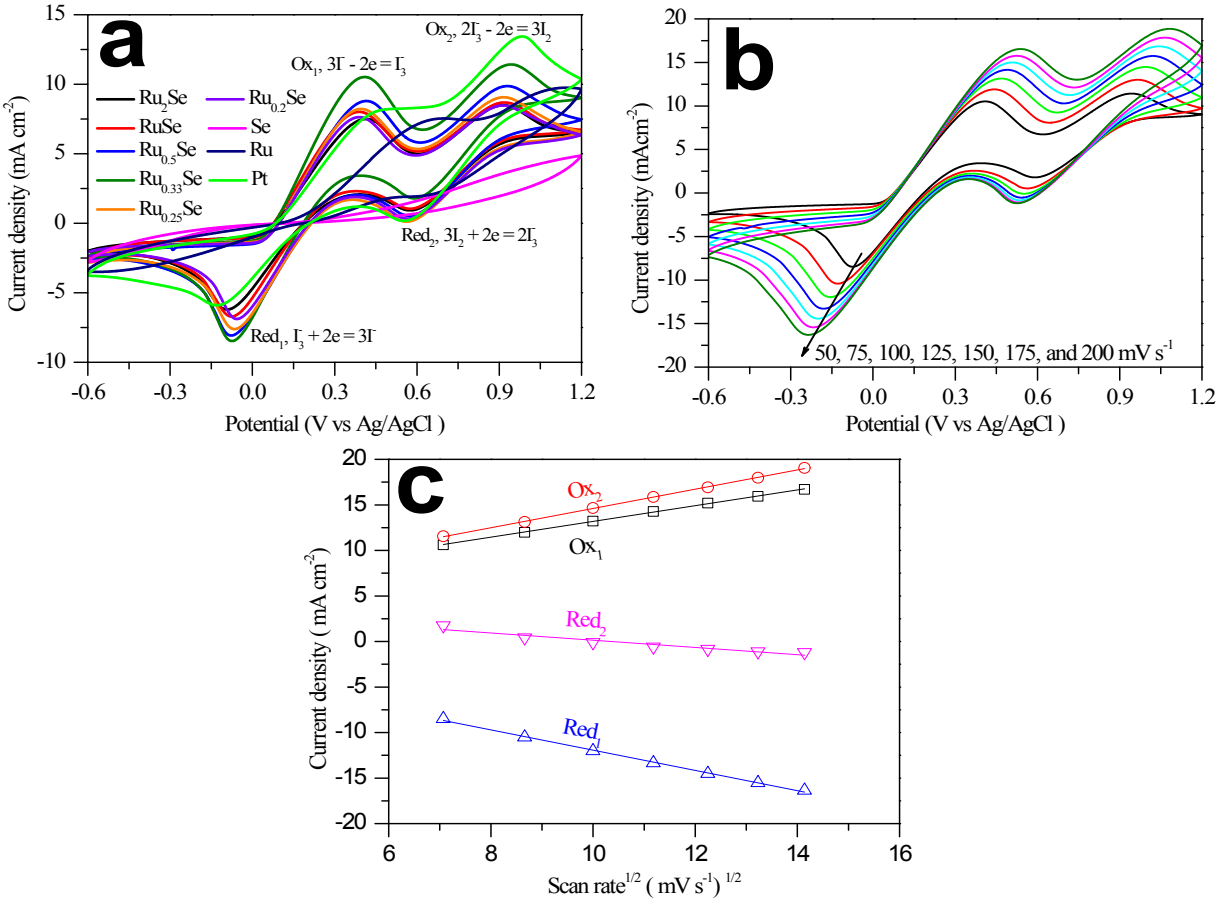

Fig. S3 (a) CV curves of various CEs recorded at a scan rate of 50 mV s^{-1}; (b) CV curves of $Ru_{0.33}Se$ alloy CE at various scan rates; (c) Relationship between square root of potential and peak current density.

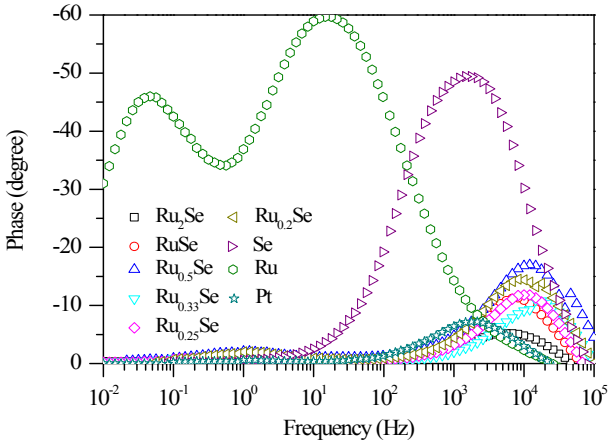

Fig. S4 Bode EIS spectra of the symmetric dummy cells from various CEs.