Supplementary Information

Hydrothermal synthesis of $CoMoO_4/Co_9S_8$ hybrid nanotubes based counter electrodes for high efficient dye-sensitized solar Cells

Jinghao Huo, Jihuai Wu*, Min Zheng, Yongguang Tu, Zhang Lan

Engineering Research Center of Environment-Friendly Functional Materials, Ministry of Education, Institute of Materials Physical Chemistry, Huaqiao University, Quanzhou 362021, China

E-mail address: jhwu@hqu.edu.cn (J. Wu).

* Corresponding author. Tel.: +86 595 22693899; fax: +86 595 22692229.

E-mail address: jhwu@hqu.edu.cn (J. Wu).

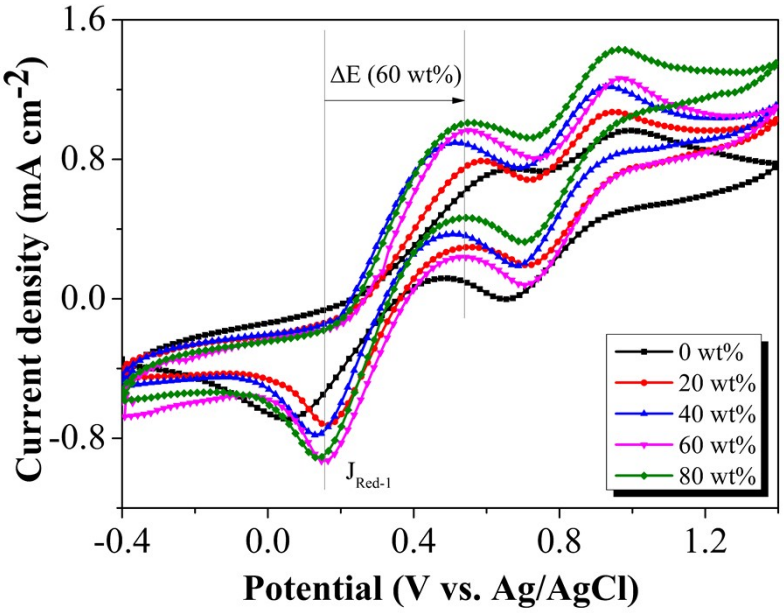

Fig. S1 CV curves of $CoMoO_4/Co_9S_8$ CEs which prepared with different contents of $(NH_4)_2MoO_4$ at a scan rate of 50 mV s^{-1}.

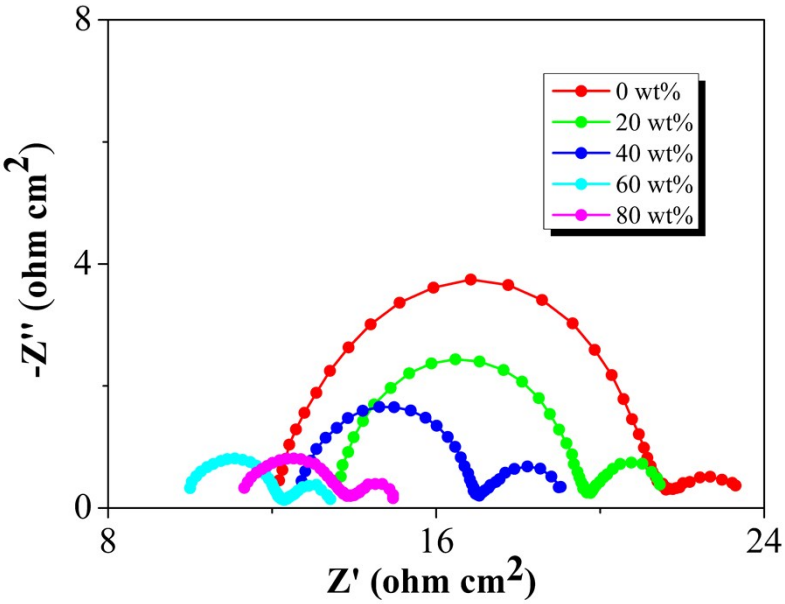

Fig. S2 EIS curves of $CoMoO_4/Co_9S_8$ CEs which prepared with different contents of $(NH_4)_2MoO_4$.

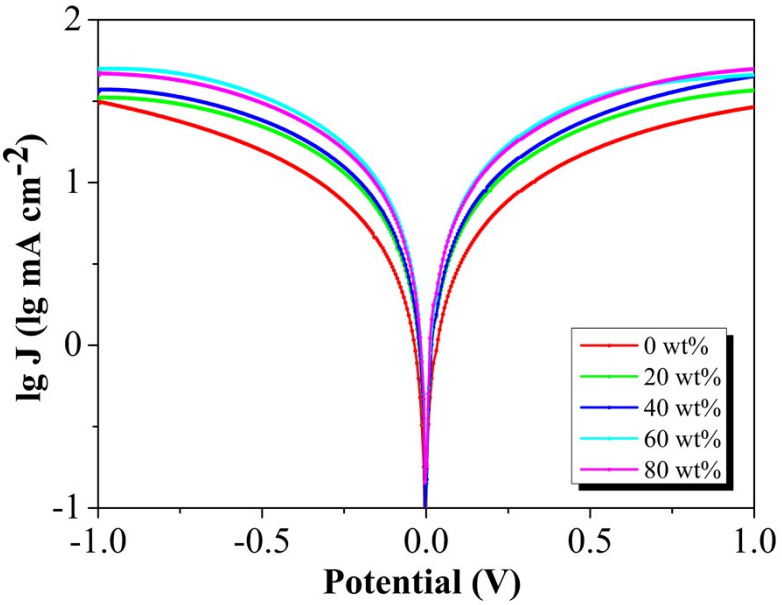

Fig. S3 Tafel curves of $CoMoO_4/Co_9S_8$ CEs which prepared with different contents of $(NH_4)_2MoO_4$.

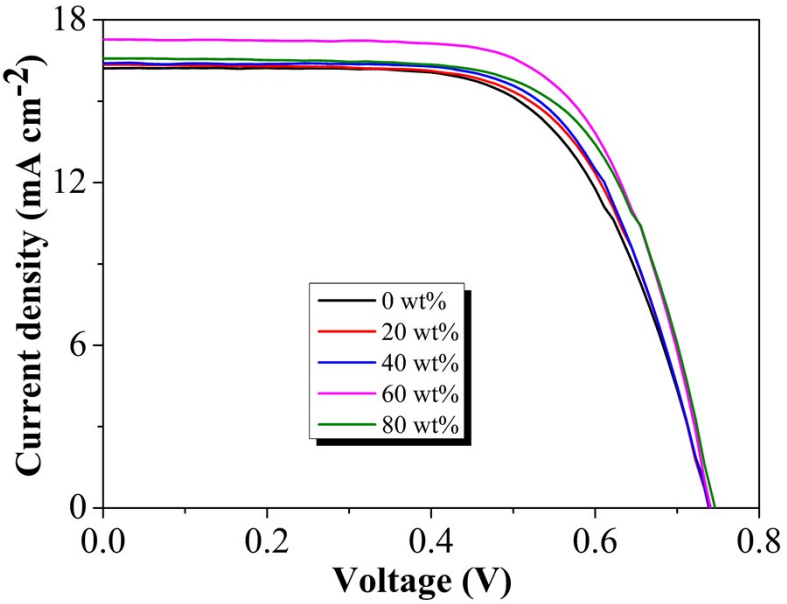

Fig. S4 J-V curves of the DSSCs based on $CoMoO_4/Co_9S_8$ CEs which prepared with different contents of $(NH_4)_2MoO_4$ under the light intensity of 100 mW cm^{-2} (AM 1.5 G).

Table S1 The photovoltaic data of the DSSCs based on $CoMoO_4/Co_9S_8$ CEs which prepared with different contents of $(NH_4)_2MoO_4$.

CE	ΔE (V)	J_{Red-1} (mA cm^{-2})	R_s (Ω cm^2)	R_{ct} (Ω cm^2)	V_{oc} (V)	J_{sc} (mA cm^{-2})	FF	PCE (%)
0%	0.612	0.688	12.17	9.52	0.741	16.214	0.640	7.69
20%	0.418	0.725	13.67	6.09	0.738	16.338	0.653	7.87
40%	0.384	0.782	12.72	4.33	0.739	16.390	0.660	7.99
60%	0.402	0.931	10.00	2.29	0.743	17.276	0.670	8.60
80%	0.418	0.909	11.32	2.51	0.747	16.579	0.666	8.25