Support information

Carbon Quantum Dots/Mixed Crystal TiO_2 Composites via Hydrogenating Process: an Efficient Photocatalyst for Hydrogen Evolution Reaction

Yunqi Tang, Rong Hao, Yu Fu, Yong Jiang, Xiangcheng Zhang, Qingjiang Pan,* Baojiang Jiang*

Key Laboratory of Functional Inorganic Material Chemistry, Ministry of Education of the People's Republic of China, Heilongjiang University, Harbin 150080, China;

E-mail: panqjitc@163.com; jiangbaojiang88@sina.com

Table S1. Amount of brookite phase TiO_2 in xCST-H_2 (x=0.2, 0.5, 1, 3, 5 wt %)

	peak height (at 25.3°, a.u.)	peak height (at 30.8°, a.u.)	relative intensity (vs. peak height)	peak area of brookite (a.u.)	total peak area (a.u.)	relative intensity (vs. peak area)
0.2% CST-H_2	1036.17	33.50	3.13%	18.78	1580.65	1.19%
0.5% CST-H_2	1184.06	17.89	1.45%	13.08	1772.93	0.74%
1% CST-H_2	883.60	46.41	4.99%	23.39	1331.23	1.76%
3% CST-H_2	1307.94	48.10	3.54%	24.98	1712.18	1.46%
5% CST-H_2	1740.27	53.34	2.97%	24.08	2117.79	1.14%

Table S2. Hydrogen evolution activities of our sample compared with literatures[1-6].

Sample	Wavelength of irradiation	Photocatalytic activity for H_2 evolution (μ mol h^{-1})	Phase of TiO_2	Consentration of catalyst (g/L)	Rate of Photocatalytic activity for H_2 evolution (μ mol g^{-1} h^{-1})
Core-shell TiO_2	Full spectrum irradiation	7.192	Anatase and rutile	0.6	11.99
P25-H_2	UV	385	P25	5.6	68.75
GQDs-TiO_2	UV-vis	4.126	P25	2	2.063
CQD-P25	UV	9.1	P25	2	4.55
0.5% CST-H_2	**AM 1.5**	**280**	**Brookite and anatase**	**1**	**280**

Reference

1. J. H. Jiang, H. Zhou, F. Zhang, T. X. Fan and D. Zhang, Appl. Surf. Sci., 2016, **368**, 309-315.
2. T. A. Kandiel, A. Feldhoff, L. Robben, R. Dillert, and D. W. Bahnemann, Chem. Mater., 2010, **22**, 2050-2060.
3. F. Amano, M. Nakata, A. Yamamotobc and T. Tanaka, Catal. Sci. Technol., 2016, **6**, 5693-5699.
4. X. Q. Hao, Z. L. Jin, J. Xu, S. X. Min and G. X. Lu, Superlattices and Microst., 2016, **94**,237-244.
5. H. J. Yu, Y. F. Zhao, C. Zhou, L. Shang, Y. Peng, Y. H. Cao, C. H. Tung and T. R. Zhang, J. Mater. Chem. A., 2014, **2**, 3344-3351.
6. J. Tian, Y. H. Leng, Z. H. Zhao, Y. Xia, Y. H. Sang, P. Hao, J. Zhan, M. C. Li, and H. Liu, Nano Energy, 2015, **11**, 419-427.

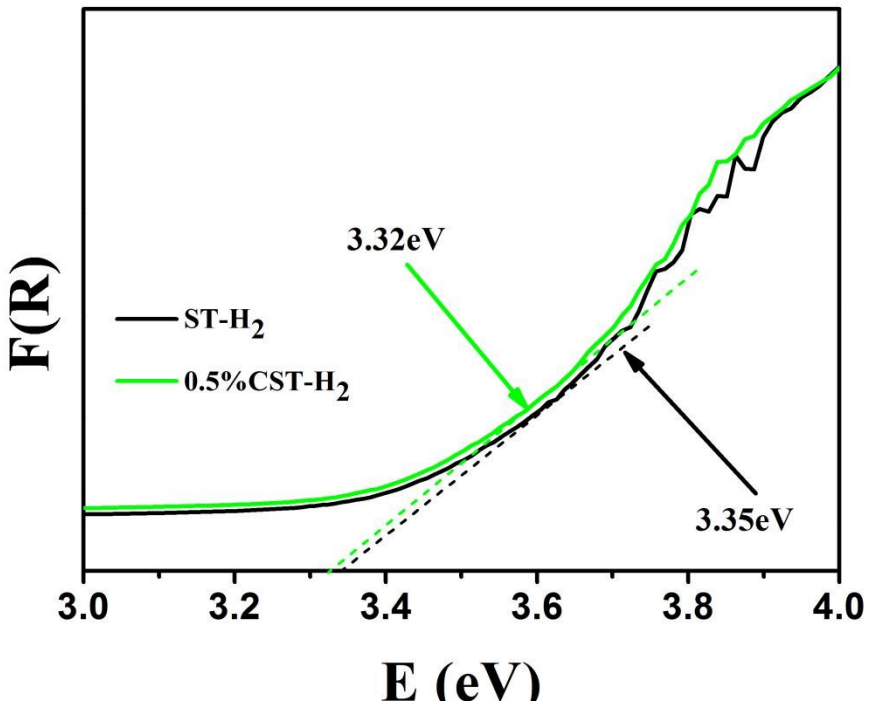

Fig. S1 Band gap energies of pure ST-H_2 and the 0.5% CST-H_2 samples.

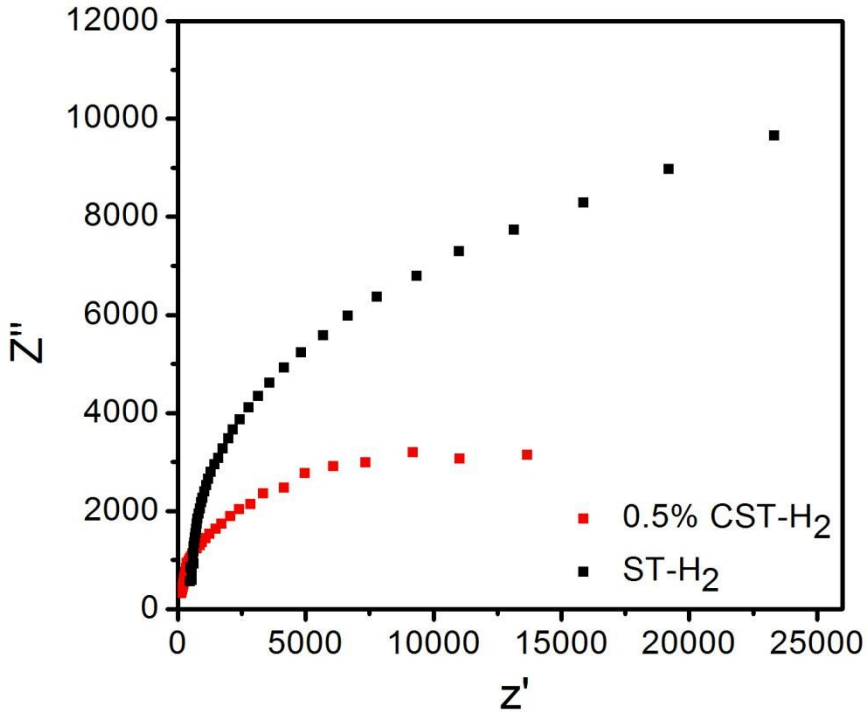

Fig. S2 Nyquist plots of the EIS data for pure ST-H_2 and 0.5% CST-H_2 samples.