Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

CdSe/ZIF-8 Nanocomposites: Synthesis and Photocatalytic CO2 Reduction Performance

Hui-Juan Peng, Pei-Qin Zheng, Hsiu-Yi Chao, Long Jiang, Zheng-Ping Qiao*

MOE Key Laboratory of Bioinorganic and Synthetic Chemistry, School of Chemistry, Sun Yat-Sen University, Guangzhou, 510275, China

* E-mail: cesqzp@mail.sysu.edu.cn

Materials

Reagents in this work was used without further purification, including 1-octadecene (ODE, 90%, ACROS), n-hexane (97%, Aladdin) , selenium powder (99.9%, Aladdin), oleylamine (90%, Innochem), trioctylphosphine (TOP, 90%, Aladdin), cadmium oxide (99%, Aladdin), 2-methylimidazole (Hmim, 98%, Macklin), zinc nitrate hexahydrate (99%, Guangzhou chemical reagent factory), n-hexanol (99%, Aladdin), Ethanol absolute (99.7%, Tianjin baishi chemical industry) $[Ru(bpy)_3]Cl_2 \cdot 6H_2O$ (bpy=2',2-bipyridine) (98%, Aladdin), triethanolamine (99%, Aladdin), acetonitrile (99.9%, Macklin).

Synthesis of CdSe QDs

CdSe QDs were synthesized via modification of previously reported procedure. [1] 0.0258 g CdO (0.2 mmol)、0.1669 g (0.6 mmol) stearic acid (SA) and 3 ml ODE were loaded into a 250 mL three-neck flask , and was heated to 120 ºC with stirring under N_2 flow. After being degassed under vacuum for 15 min, the mixture was heated up to 275 ºC to form a colorless clear solution. At this temperature, the Se solution containing 0.1316 g (1.7 mmo1) of Se dissolved in 1.2 mL OAm and 0.8 ml ODE was swiftly injected into the reaction flask., and the reaction was immediately terminated by removing the heat resource. The resulting CdSe QDs were precipitated by adding ethanol and dispersed in 5ml hexane as a stock solution.

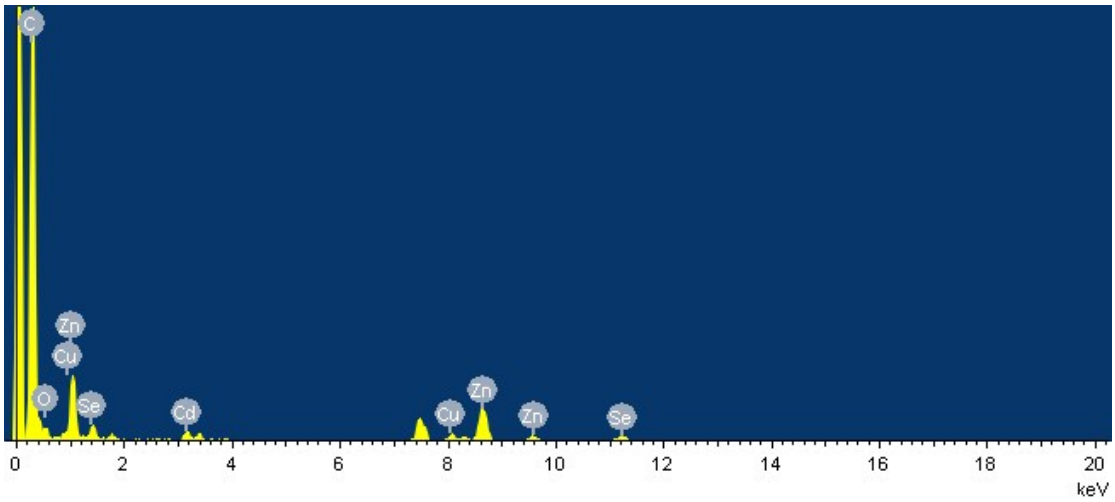

Fig. S1 EDS spectrum of sample 3.

Table. S1 Element analysis of sample 3.

Element	Weight%	Atomic%
C	55.10	86.89
O	0.39	0.46
Ni	11.32	3.65
Zn	26.82	7.77
Se	2.16	0.52
Cd	4.21	0.71
Total quantity	100	

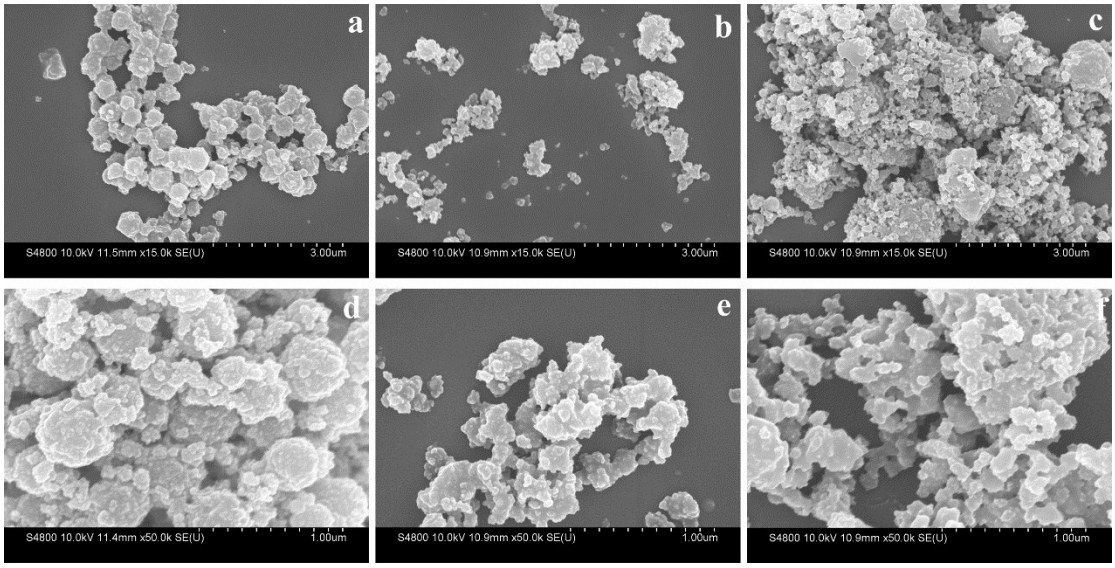

Fig. S2 SEM images of sample 1(a, c), 2(b, e) and 3(c,f) (a-c magnification 15k, d-f magnification 50k)

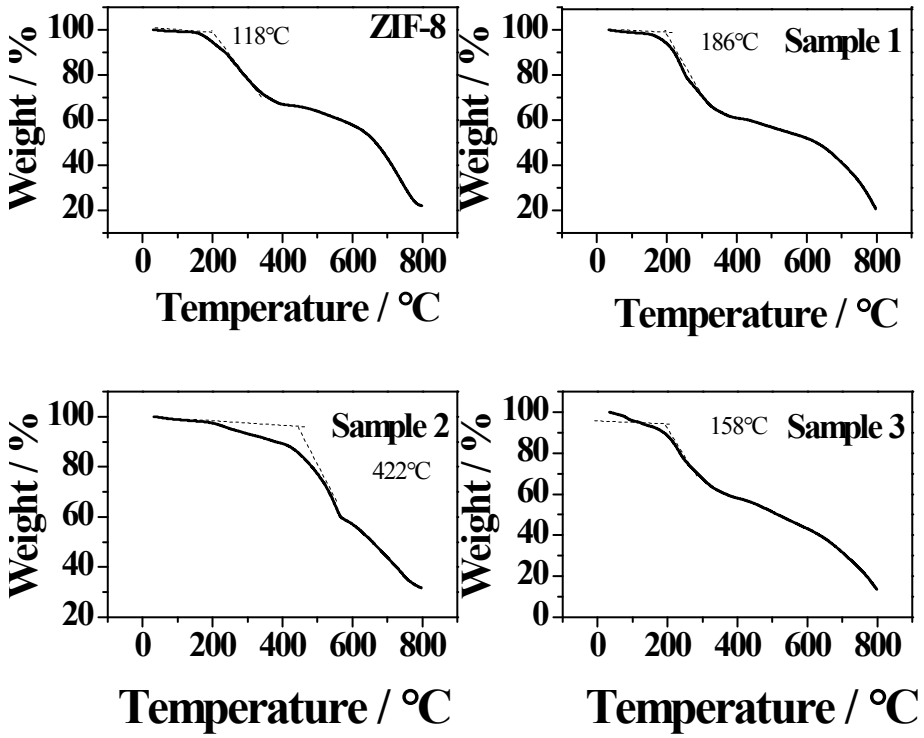

Fig.S3 TGA of ZIF-8 and samples.

Table S2 Summary of CO_2 photocatalytic activities of the samples (with N_2 as gas feedstock).

Sample	CO production rate (μmol g^{-1} h^{-1})	CH_4 production rate (μmol g^{-1} h^{-1})
Sample 1	0.024	0.104
Sample 2	0.009	0.000
Sample 3	0.031	0.094

Reference

1. B. Mahler, P. Spinicelli, S. Buil, X. Quelin, J. P. Hermier and B. Dubertret, *Nature materials*, 2008, **7**, 659-664.