Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Materials for

ZIF-9(III) Nanosheets synthesized in Ionic Liquid/Ethanol Mixture for Efficient Photocatalytic Hydrogen Production

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Results and Discussion

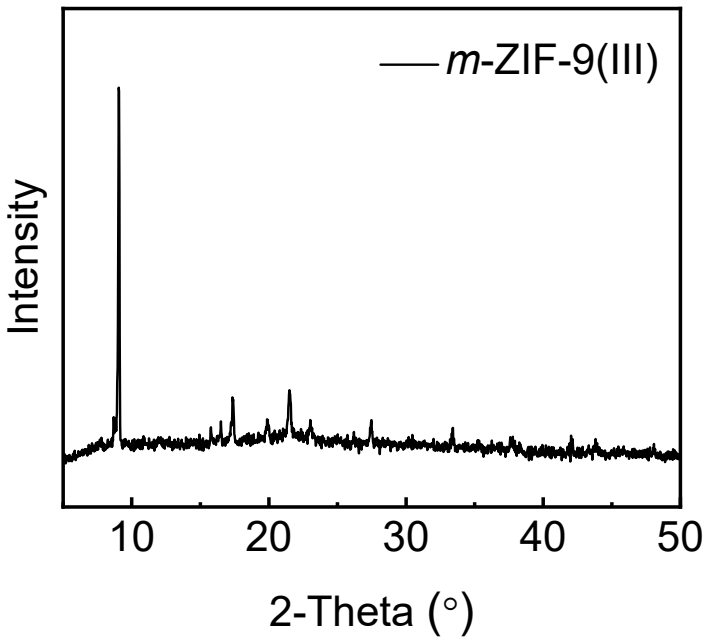

Fig. S1. XRD pattern of *m*-ZIF-9(III).

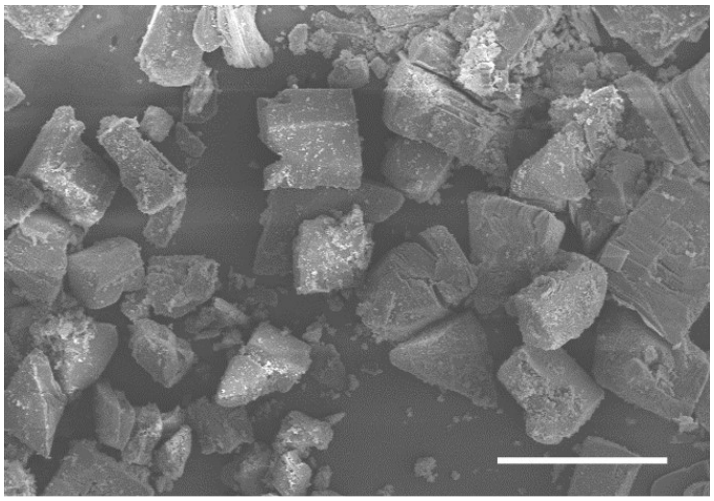

Fig. S2. SEM image of *m*-ZIF-9(III). Scale bar: 100 μm.

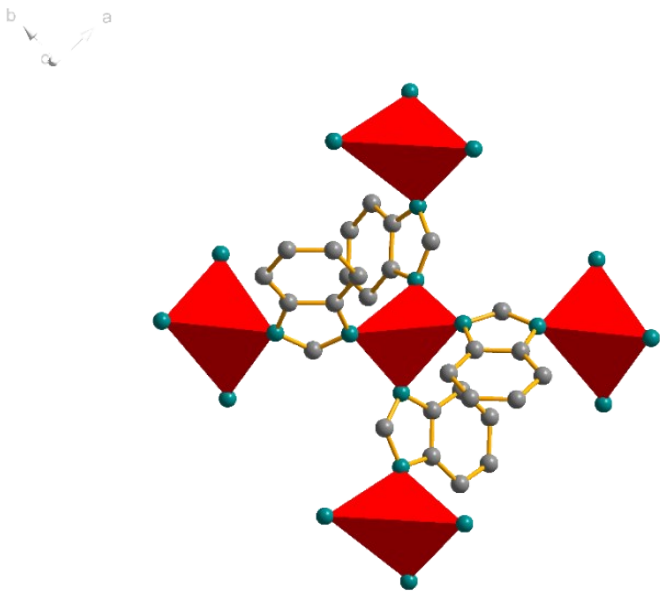

Fig. S3. CoN_4 tetrahedral (red) structure in ZIF-9(III).

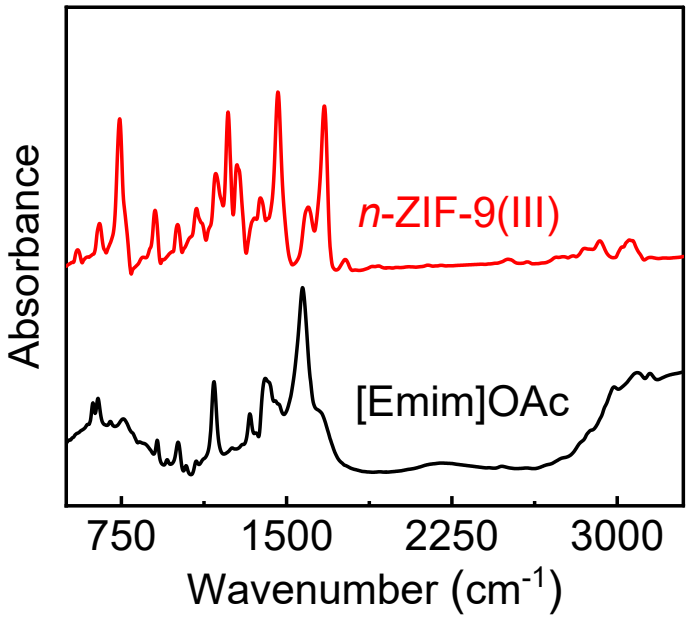

Fig. S4. FT-IR spectra of *n*-ZIF-9(III) and pure [Emim]OAc.

For *n*-ZIF-9(III), the absorptions at ≈741, 1236, 1293, 1464 and 1675 cm^{-1} can be assigned to C-H bending, C-C stretching, C-N stretching, C=C stretching and C=N stretching, respectively. The characteristic FT-IR vibrations of [Emim]OAc cannot be observed in the FT-IR spectrum of the *n*-ZIF-9(III), proving that [Emim]OAc is removed completely.

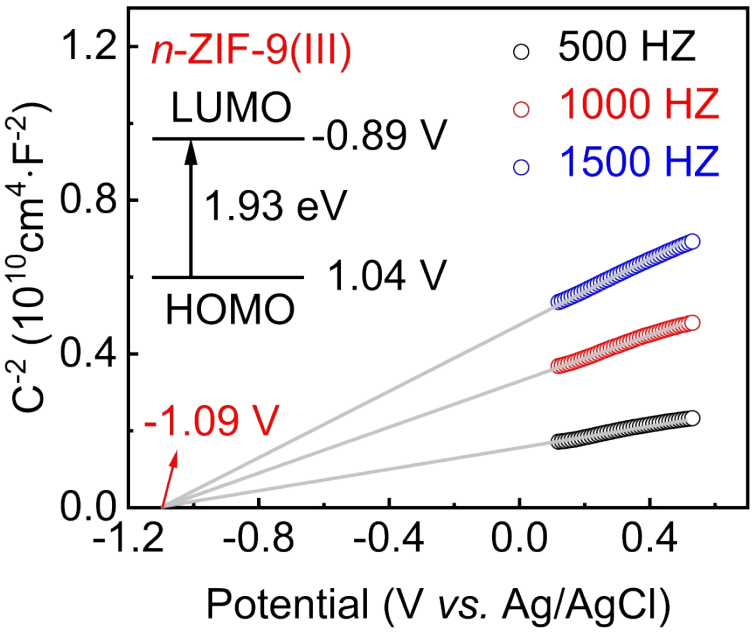

Fig. S5. Mott-Schottky plots of *n*-ZIF-9(III) in 0.2 M Na_2SO_4 aqueous solution, with inset of energy diagram of the LUMO and HOMO levels of *n*-ZIF-9(III).

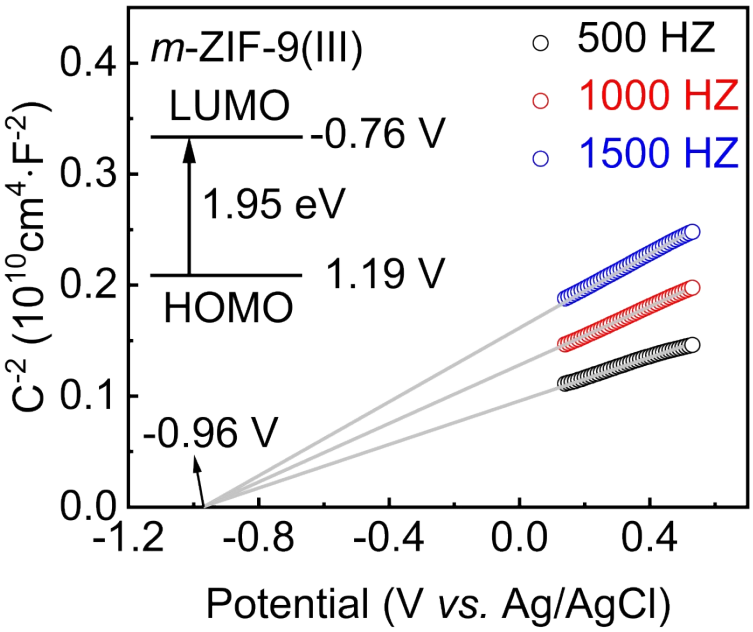

Fig. S6. Mott-Schottky plots of *m*-ZIF-9(III) in 0.2 M Na_2SO_4 aqueous solution, with inset of energy diagram of the LUMO and HOMO levels of *m*-ZIF-9(III).

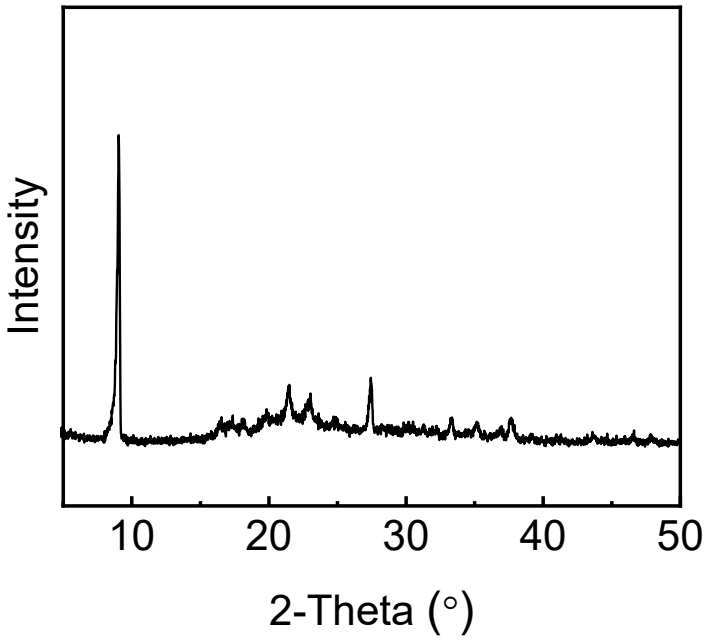

Fig. S7. XRD pattern of *n*-ZIF-9(III) after photocatalytic reaction.

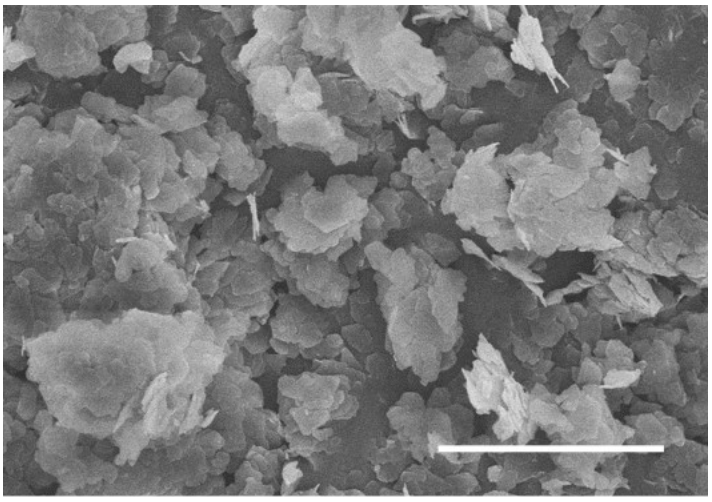

Fig. S8. SEM image of *n*-ZIF-9(III) after photocatalytic reaction. Scale bar: 20 μm.

Table S1. Comparison of the reaction conditions and performances of MOF or MOF-based photocatalysts for photocatalytic H_2 production.

Photocatalysts	Conditions (Irradiation, Sacrificial agent, Photosensitizer, Cocatalyst)	H_2 Production Rate (mmol g^{-1} h^{-1})	Ref.
	MOF photocatalysts		
n-ZIF-9(III)	300 W Xe lamp (λ > 420 nm), Triethanolamine, $[Ru(bpy)_3]^{2+}$	112.37	This work
ZIF-67	450 nm LED light, Triethanolamine, $[Ru(bpy)_3]^{2+}$	0.84	[1]
Wells-Dawson-type polyoxometalates	Visible light, Methanol, $[Ru(bpy)_3]^{2+}$	3.55	[2]
Mo_2S_{12}@MIL-101(Al)	300 W Xe lamp (λ > 420 nm), Triethanolamine, $[Ru(bpy)_3]^{2+}$	27.08	[3]
Ni@MOF-5	300 W Xe lamp (λ > 420 nm), Triethanolamine, Eosin Y, Ni nanoparticles	30.22	[4]
NiMo@MIL-101	300 W Xe lamp (λ > 420 nm), Triethanolamine, Eosin Y, NiMo alloy clusters	14.80	[5]
Pt@NH_2-UiO-66	300 W Xe lamp (λ > 420 nm), methanol, Calix-3, Pt particles	1.53	[6]
Pt@UiO-66(Zr)	300 W Xe lamp (λ > 420 nm), Triethanolamine, Rhodamin B, Pt nanoparticles	0.12	[7]
NH_2-MIL-125(Ti)/CN/ $Ni1_{5.8}Pd_{2.1}$	300 W Xe lamp, Triethanolamine, Eosin Y, NiPd nanoparticles	8.70	[8]
RCGO/U6N (graphene wrapped on UiO-66-NH_2)	300 W Xe lamp (λ > 420 nm), Triethanolamine, Erythrosin B	41.4	[9]

Co(II)@MIL-125-NH_2	300 W Xe lamp (λ > 380 nm), Triethanolamine	0.55	[10]
CdS/MIL-101(Cr)	300 W Xe lamp (λ > 420 nm), Lactic acid,Pt particles	0.76	[11]
Ni-TBAPy-NB (Ni MOF)	300 W Xe lamp (λ > 420 nm), ascorbic acid	5	[12]

References

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