Electronic Supplementary Information:

A Novel g-C3N4 Based Photocathode for Photoelectrochemical Hydrogen Evolution

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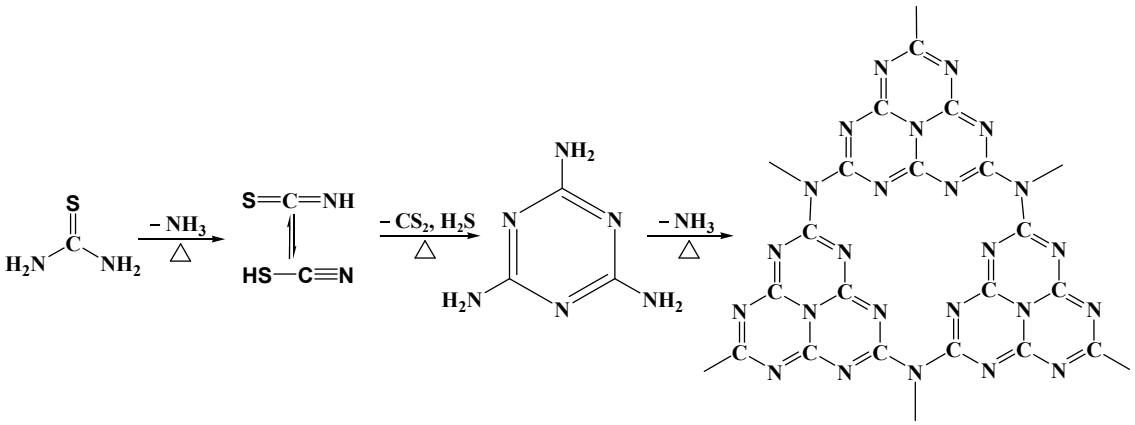


Scheme S1 The polycondenzation of thiourea into a graphitic carbon nitride network at high temperatures.

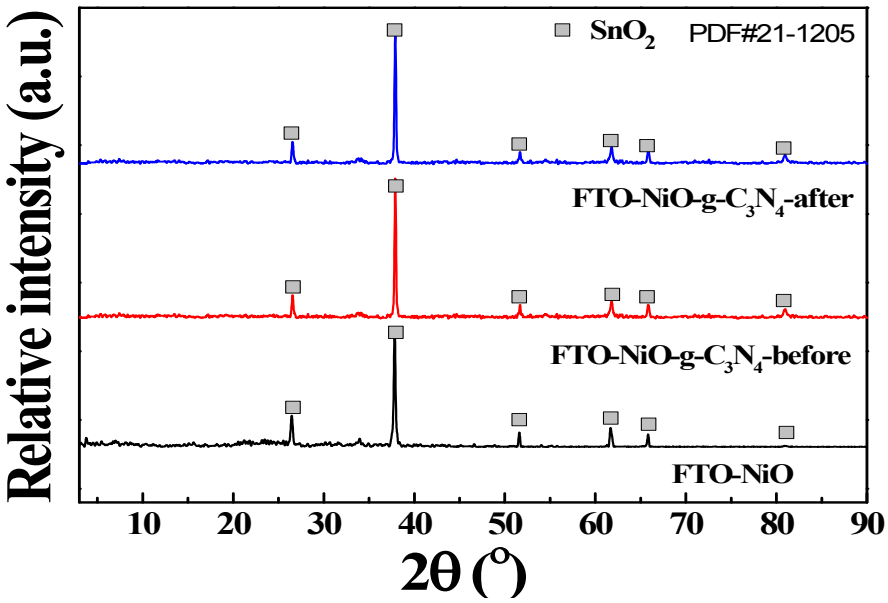


Figure S1 XRD patterns of the NiO/FTO, g-C_3N_4/NiO/FTO before and after the reaction.

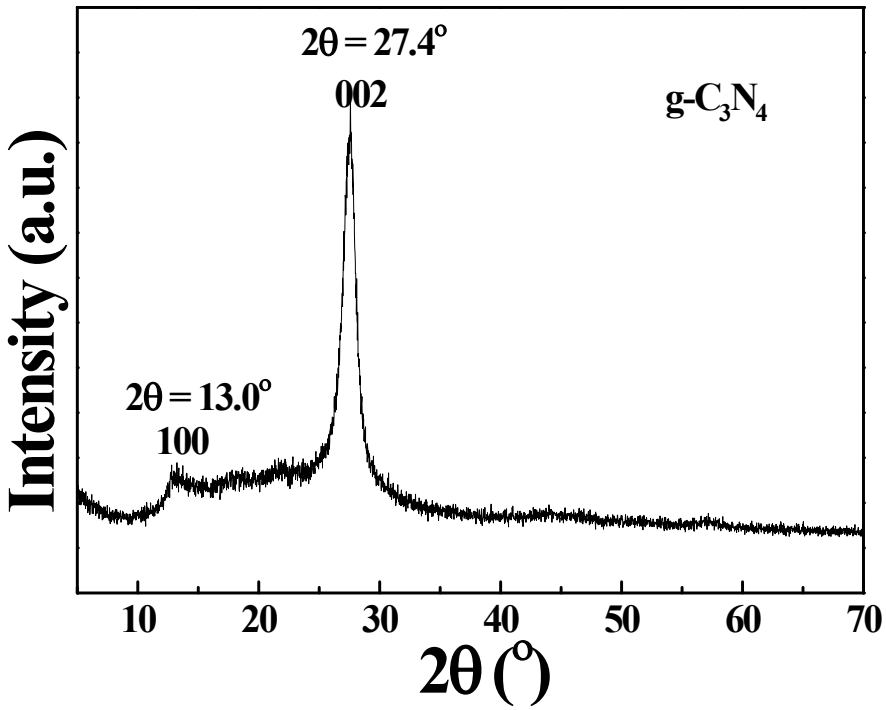


Figure S2 XRD patterns of pure g-C_3N_4。

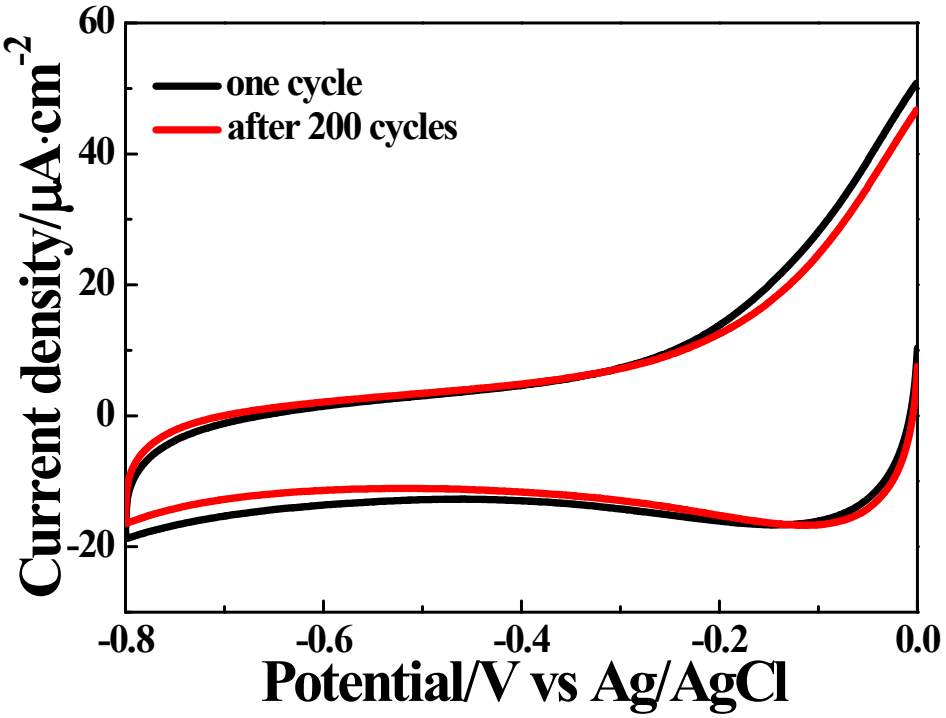
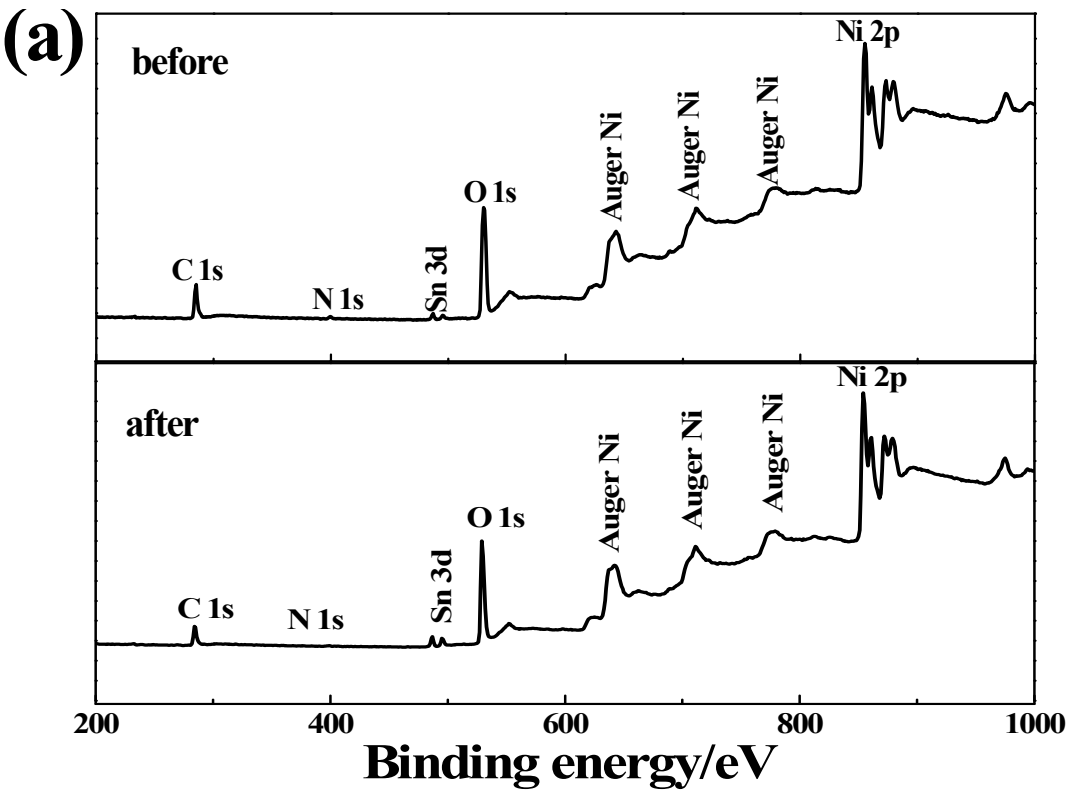
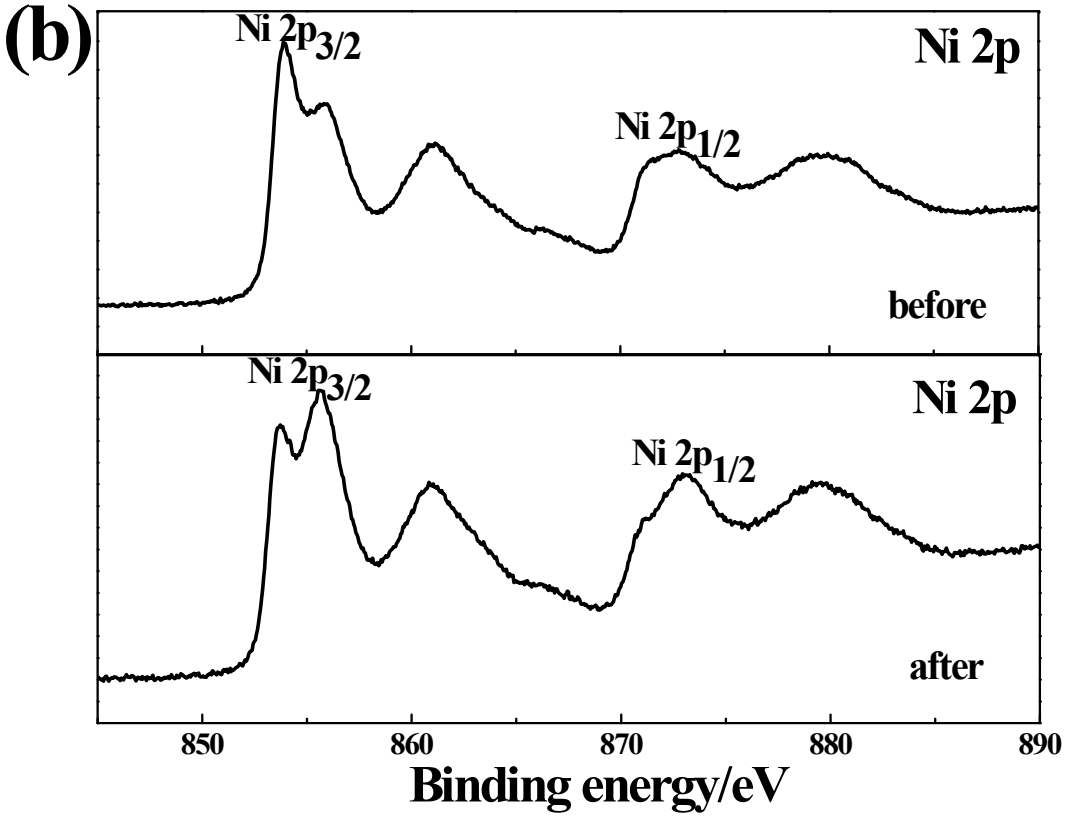
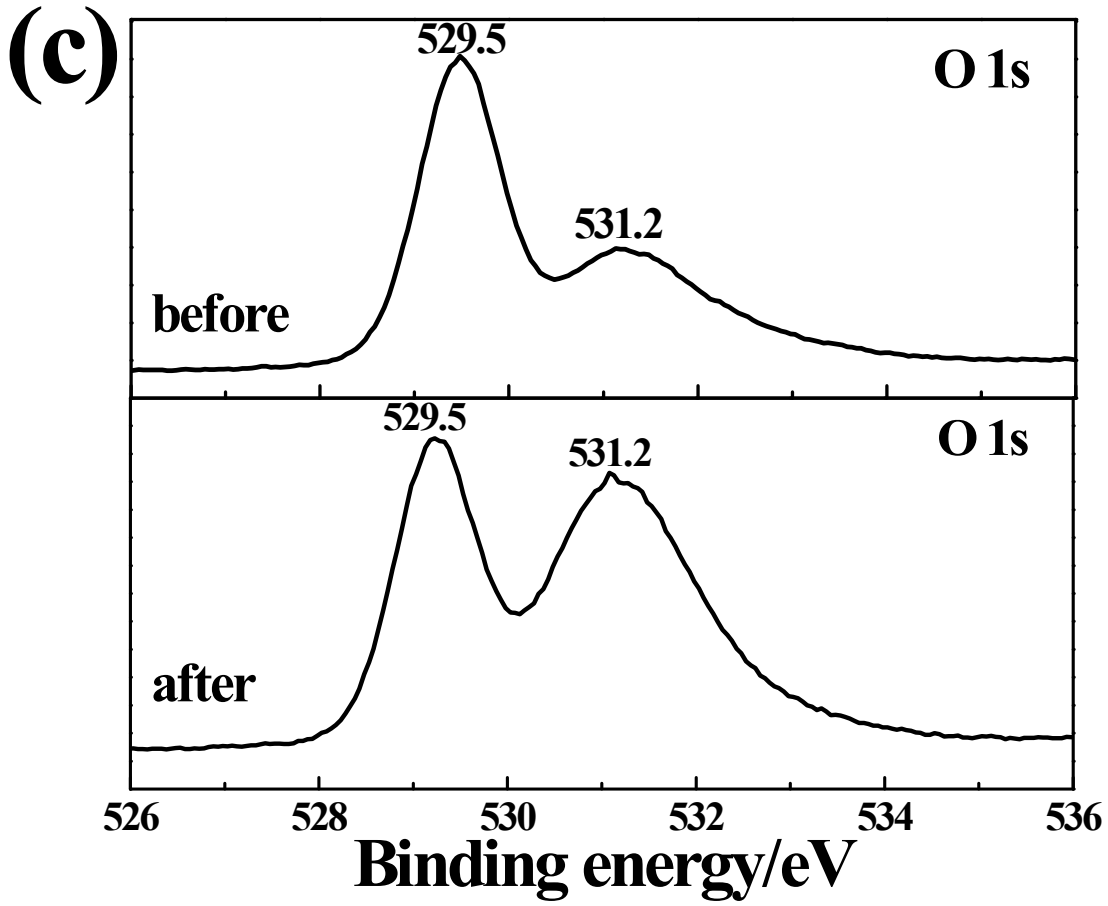
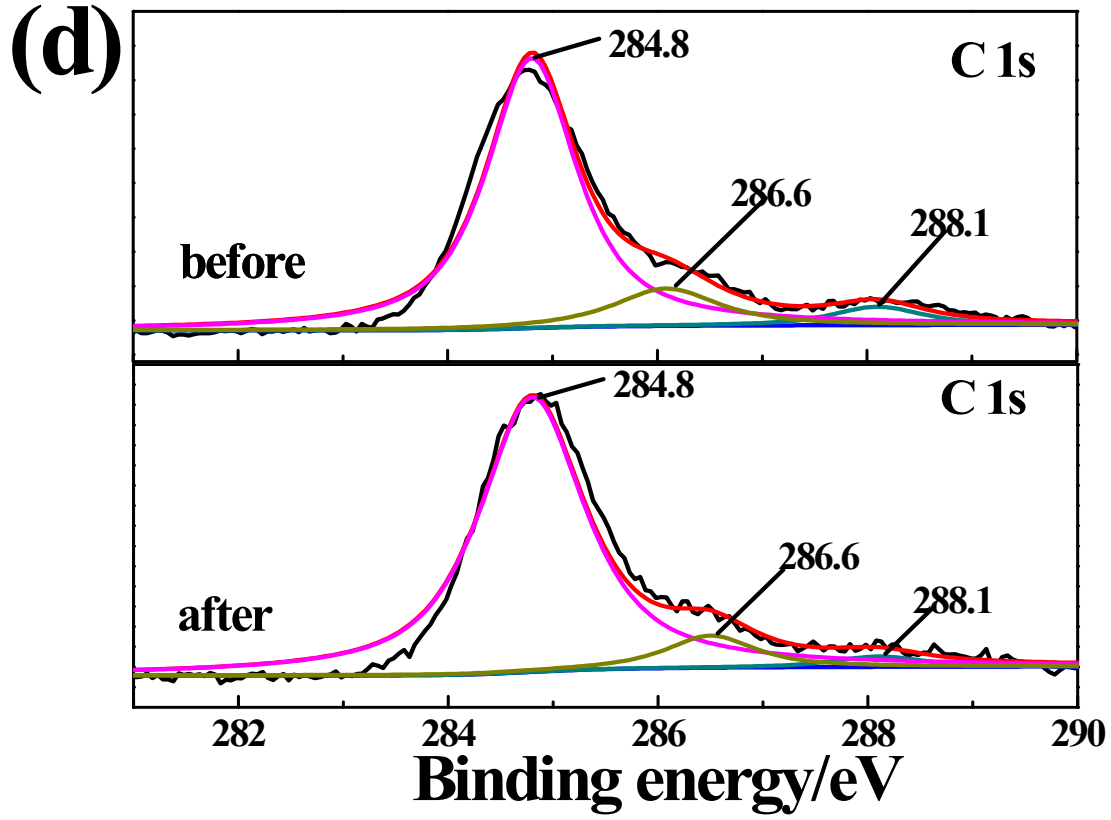


Figure S3 Cyclic voltammetry of g-C_3N_4/NiO/FTO electrode in N_2 saturated Na_2SO_4 solution (0.1M). The spectra were collected by scanning from 0 to -0.8 V vs Ag/AgCl with scan speed of 0.1Vs^{-1}.


(a)
before
after
C 1s
N 1s
Sn 3d
O 1s
Auger Ni
Auger Ni
Auger Ni
Ni 2p
200
400
600
800
1000
Binding energy/eV


(b)
Ni 2p3/2
Ni 2p1/2
Ni 2p
before
after
850
860
870
880
890
Binding energy/eV


(c)
529.5
O 1s
531.2
before
529.5
O 1s
531.2
after
526
528
530
532
534
536
Binding energy/eV


(d)
284.8
C 1s
286.6
288.1
before
284.8
C 1s
286.6
288.1
after
282
284
286
288
290
Binding energy/eV

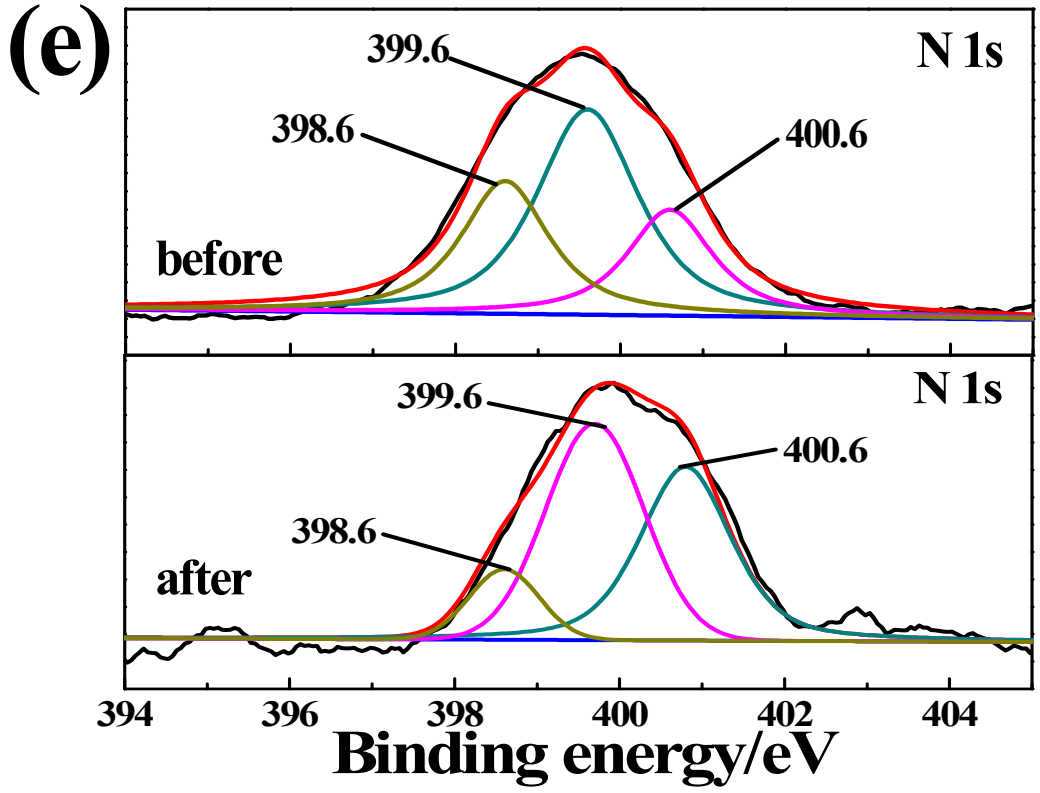


Figure S4 (a) Survey scan XPS spectra in the binding energy range 200-1000 eV and high-resolution spectra, (b) Ni2p, (c) O1s, (d) C1s and (e)N1s of g-C_3N_4/NiO before and after reaction.

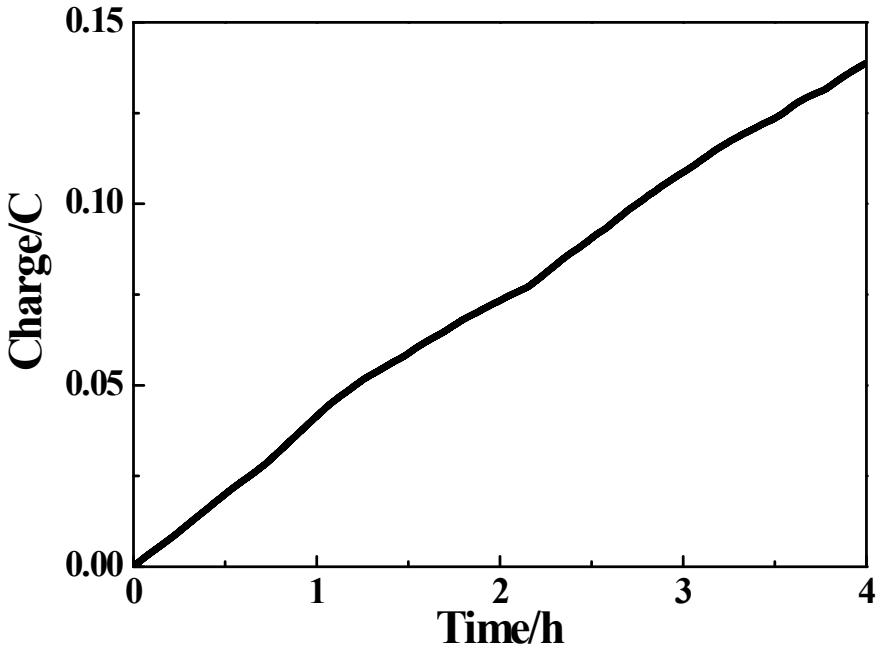


Figure S5 PEC hydrogen production over g-C_3N_4/NiO photocathode during 4 h under sunlight irradiation in Wuxi city on Dec. 26, 2016. Outdoor temperature: 4–14 ^oC, time: 10:15–14:15.

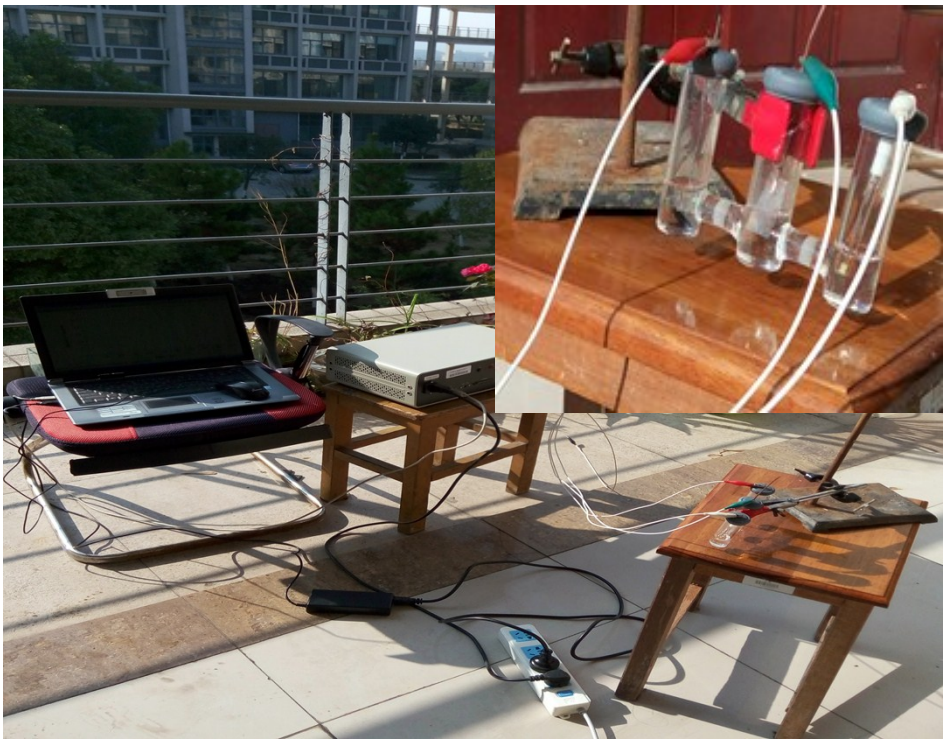


Figure S6 The photo of outdoor equipment of sunlight-driven PEC hydrogen production over g-C_3N_4/NiO photocathode during 4 h under sunlight irradiation in Wuxi city on Dec. 26, 2016. Outdoor temperature: 4–14 oC, time: 10:15–14:15.