Supporting Information

Photoelectrocatalytic Reduction of Nitrate to Nitrogen Gas by Cu₂O Nanorod Arrays with High Stability

Wei Liu,^{1,2} Bin Huang,^{2,3} Peng Chen,^{2,4} Dongran Wang,^{2,5} Pengxiang Wang,^{2,5} Chuhong Zhu,^{1*} Zhulin Huang,^{2,5*} Haibin Tang,^{2,5*} and Guowen Meng^{2,5}

¹ School of Materials Science and Engineering, Anhui University, Hefei 230601, China.

² Key Laboratory of Materials Physics, and Anhui Key Laboratory of Nanomaterials and Nanotechnology, Institute of Solid State Physics, HFIPS, Chinese Academy of Sciences, Hefei, Anhui 230031, China.

³ Guangxi Key Laboratory of Chemistry and Engineering of Forest Products, Guangxi Minzu University, Nanning, 530006, P. R. China.

⁴ School of Advanced Materials and Nanotechnology, Xidian University, Xi'an,
710126 P. R. China.

⁵ University of Science and Technology of China, Hefei, Anhui 230026, China.

*Corresponding authors: Email: hbtang@issp.ac.cn (H. Tang); chzhu@ahu.edu.cn (C.

Zhu); zlhuang@issp.ac.cn (Z. Huang)



Figure S1. (a-b) SEM images, (c-d) HRTEM image, and (e-f) EDS of the prepared Cu(OH)₂ nanorod.



Figure S2. Current responses of the Cu₂O photocathode under chopped light illumination (reaction conditions: 50 mg L^{-1} NO₃⁻, pH=7, applied potential =-0.39 V vs.RHE, 0.05 M K₂SO₄). The decay of current is due to the consumption of NO₃⁻ in the solution.



Figure S3. The applied bias photon-to-current efficiency (ABPE) curves of the asprepared Cu₂O photocathode.



Figure S4. The time-dependent concentration evolution of the NO_3^--N , NO_2^--N and NH_4^+-N (reaction conditions: 100 mg L⁻¹ NO_3^- , pH=7, applied potential =-0.59 V vs. RHE, 0.05 M K₂SO₄).



Figure S5. The time-dependent concentration evolution of the NO_3^--N , NO_2^--N and NH_4^+-N (reaction conditions: 150 mg L⁻¹ NO_3^- , pH=7, applied potential = =-0.59 V vs. RHE, 0.05 M K₂SO₄).



Figure S6. The time-dependent concentration evolution of the NO_3^--N , NO_2^--N and NH_4^+-N (reaction conditions: 200 mg L⁻¹ NO_3^- , pH=7, applied potential = =-0.59 V vs. RHE, 0.05 M K₂SO₄).



Figure S7. The time-dependent concentration evolution of the NO_3^--N , NO_2^--N and NH_4^+-N (reaction conditions: 50 mg L⁻¹ NO_3^- , pH=11, applied potential = =-0.35 V vs. RHE, 0.05 M K₂SO₄)



Figure S8. The time-dependent concentration evolution of the NO_3^--N , NO_2^--N and NH_4^+-N (reaction conditions: 50 mg L⁻¹ NO_3^- , pH=7, applied potential = =-0.59 V vs. RHE, real lake water)