



Electronic Supplementary Information (ESI)

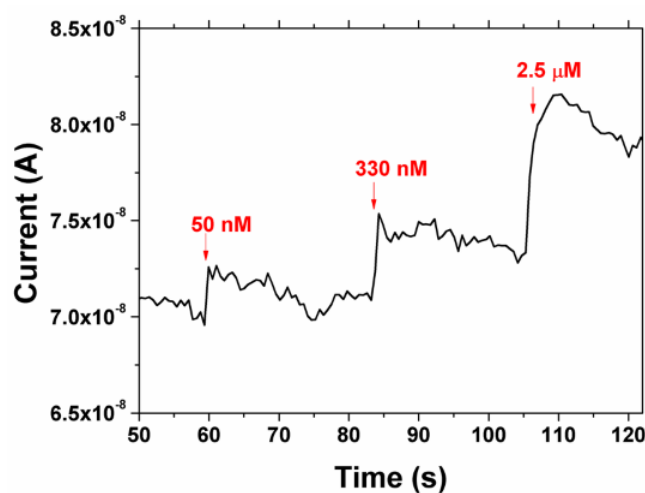
Ultrasensitive Detection of Orthophosphate Ions with Reduced Graphene Oxide/Ferritin Field-effect Transistor Sensors

Shun Mao,^{ab} Haihui Pu,^a Jingbo Chang,^{a*} Xiaoyu Sui,^a Guihua Zhou,^a Ren Ren,^a Yantao Chen^{ac} and Junhong Chen,^{a*}

^a Department of Mechanical Engineering, University of Wisconsin-Milwaukee, 3200 N. Cramer Street, Milwaukee, WI 53211, USA

^b State Key Laboratory of Pollution Control and Resource Reuse, College of Environmental Science and Engineering, Tongji University, 1239 Siping Road, Shanghai 200092, China

^c Tianjin Key Laboratory for Photoelectric and Devices, School of Materials Science and Engineering, Tianjin University of Technology, Tianjin 300384, China

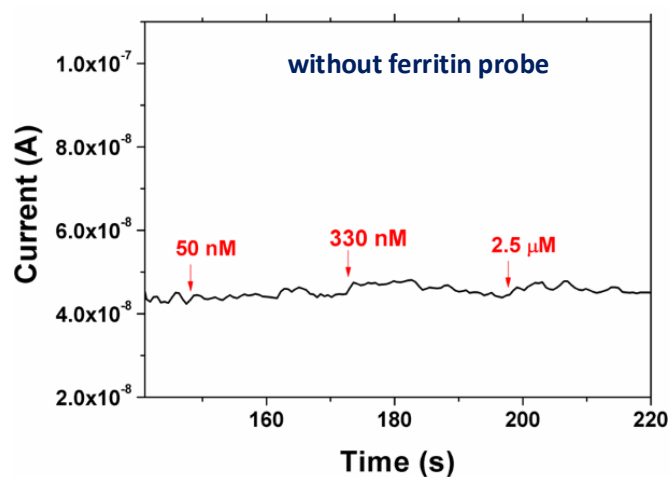
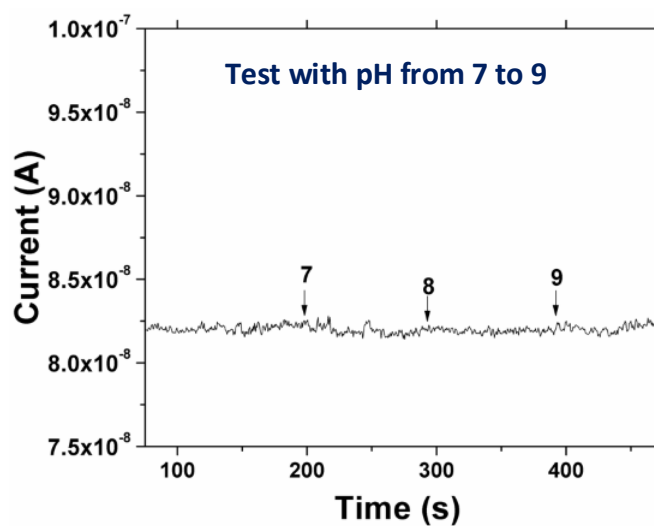


^a Department of Mechanical Engineering, University of Wisconsin-Milwaukee, 3200 N. Cramer Street, Milwaukee, WI 53211, USA. E-mail: jhchen@uwm.edu (J. Chen), chang69@uwm.edu (J. Chang)

^b State Key Laboratory of Pollution Control and Resource Reuse, College of Environmental Science and Engineering, Tongji University, 1239 Siping Road, Shanghai 200092, China

^c Tianjin Key Laboratory for Photoelectric and Devices, School of Materials Science and Engineering, Tianjin University of Technology, Tianjin 300384, China

† Electronic Supplementary Information (ESI) available: sensing response of another sensor without probe linker; control sensing test of the sensor without probe; pH impact study; and sensor recycling study.

Figure S1. Dynamic sensing responses of another typical sensor without probe linker.**Figure S2.** Control sensing test of a sensor without ferritin probe. The sensor without probe shows negligible responses to HPO_4^{2-} .**Figure S3.** Sensor responses to control water solutions with a pH from 7 to 9. The sensor has no responses to pH in this range, which indicates that the sensor is stable for HPO_4^{2-} sensing in a weak basic condition.

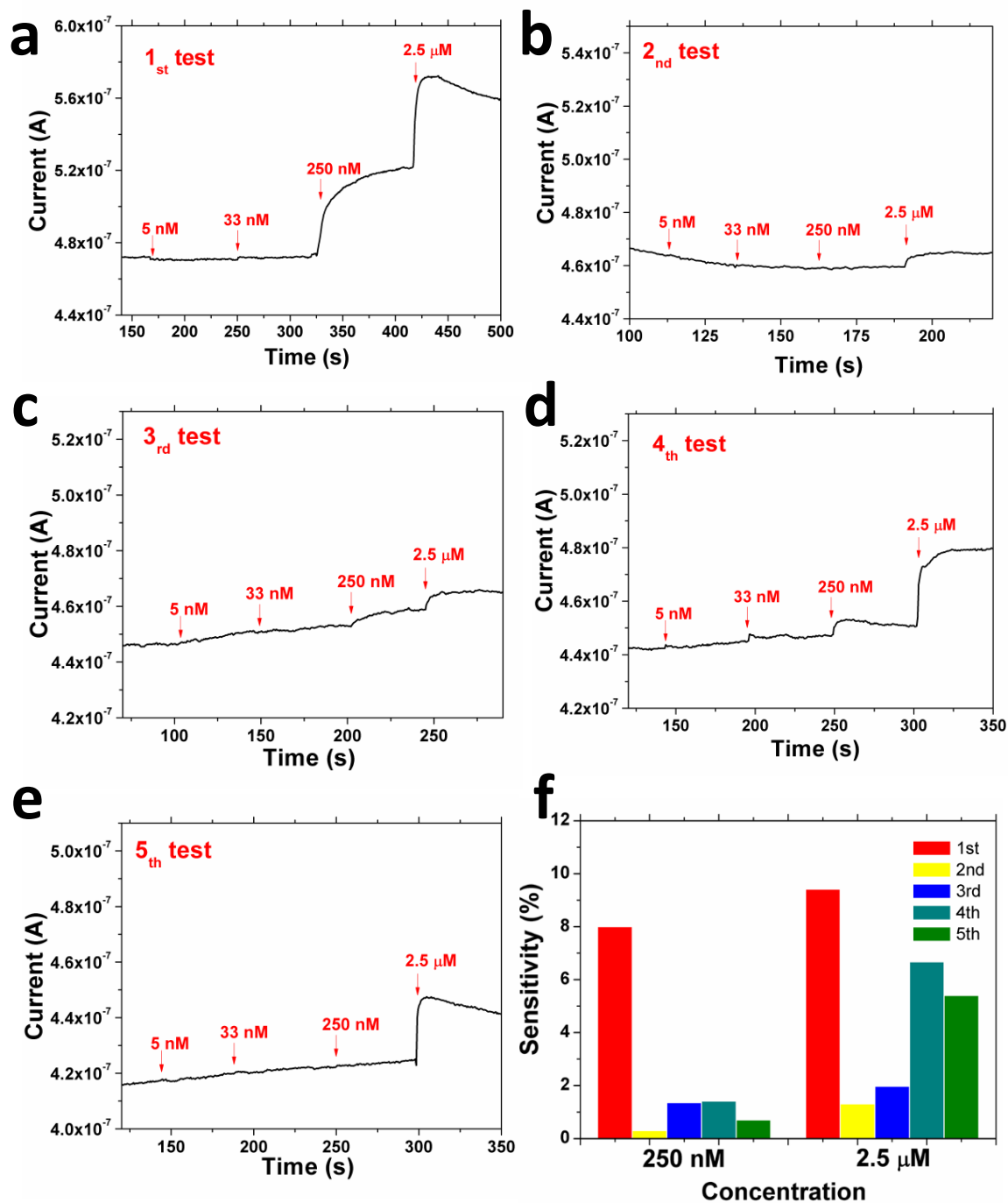


Figure S4. (a-e) Recycling tests of the rGO/ferritin sensor. The sensor was tested for five times with a probe recovery treatment in an NaOH and NaCl solution between each test. (f) Sensitivity summary of the sensor to 250 nM and 2.5 μM HPO₄²⁻ in each test.