Supporting Information

Electrochemical Sensors based on MoS_x-functionalized Laser Induced Graphene for Real-time Monitoring of Phenazines produced by *Pseudomonas aeruginosa*

Keren Zhou[1,2], Vinay Kammarchedu[1,2], Derrick Butler[1,2], Pouya Soltan Khamsi[1,2], and Aida Ebrahimi[1,2,3,*]

1. School of Electrical Engineering and Computer Science, The Pennsylvania State University, University Park, PA 16802, USA
2. Materials Research Institute, The Pennsylvania State University, University Park, PA 16802, USA
3. Department of Biomedical Engineering, The Pennsylvania State University, University Park, PA 16802, USA

*Correspondence: sue66@psu.edu

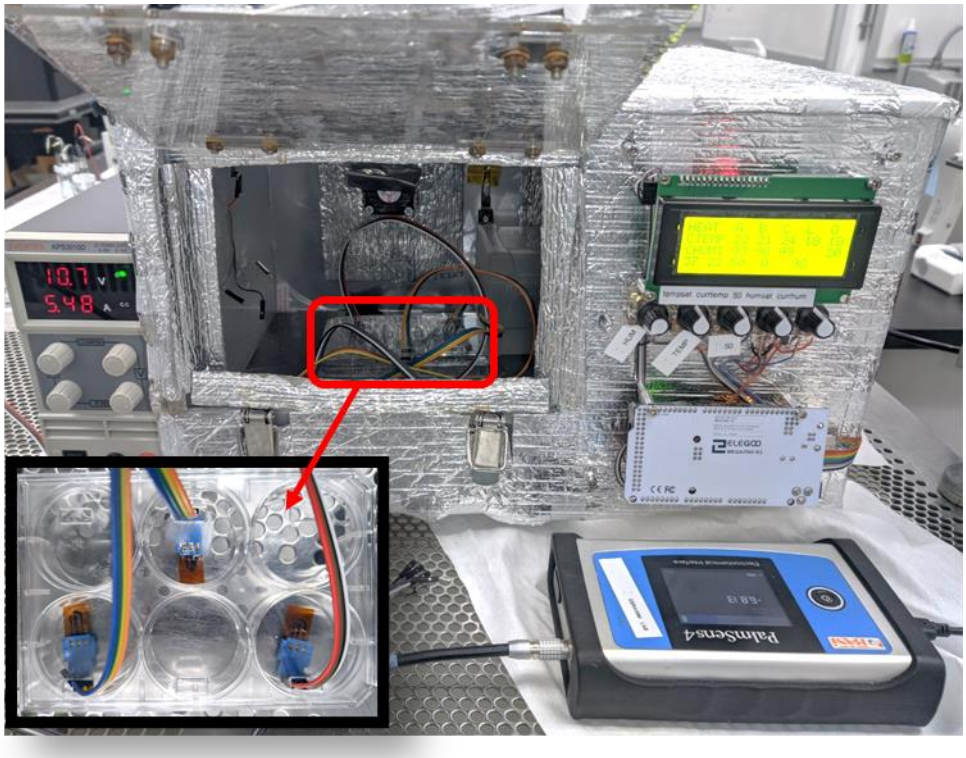

Figure S1. A picture of the biofilm test setup, including a custom-made humidity chamber, the connectors, cables, and a portable potentiostat. The inset shows three sensors.

615

616

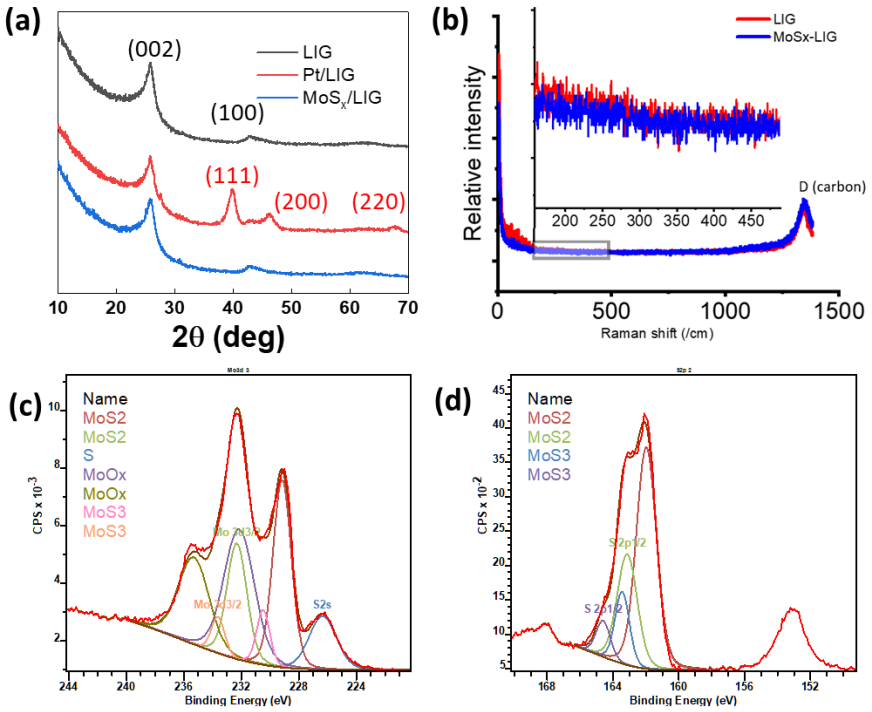

Figure S2 (a) The XRD analysis of LIG, Pt/LIG and MoS_x/LIG. (b) Raman spectrum of MoS_x/LIG. High-resolution XPS spectra of (c) Mo 3d and (d) S 2p with curve fitting.

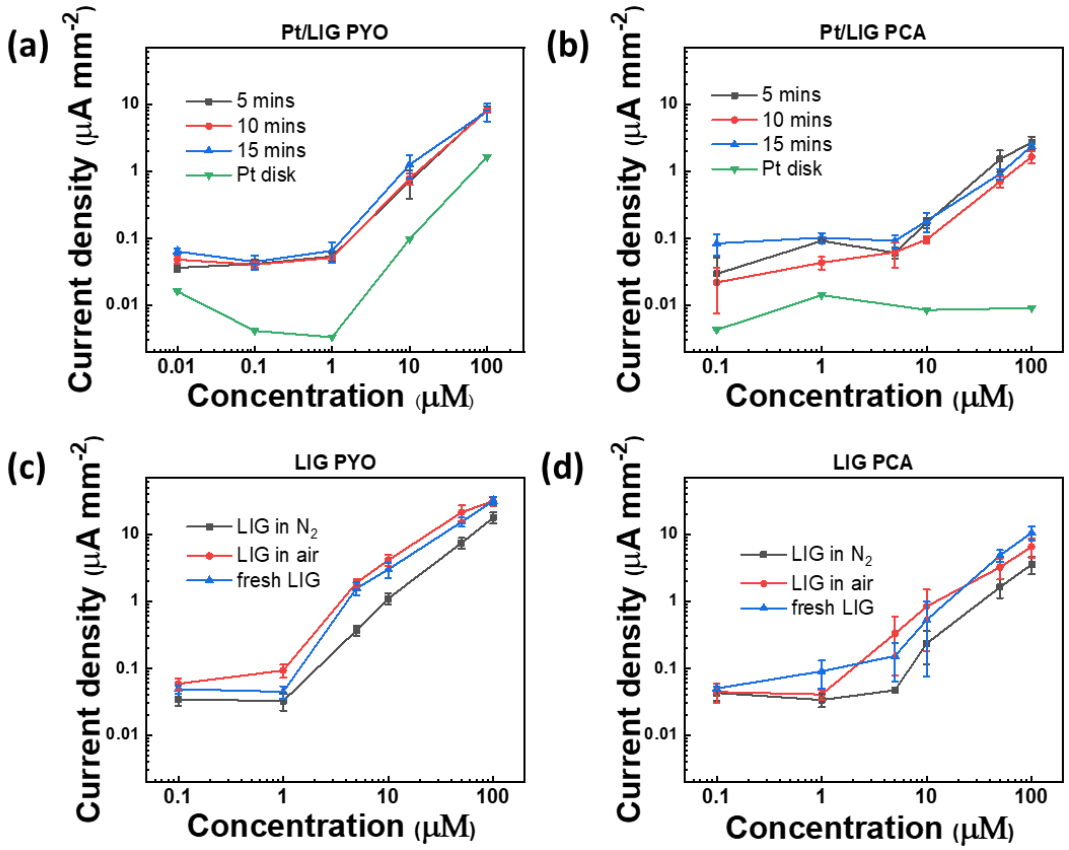

Figure S3. The calibration curves of Pt/LIG with 0.1~100 uM PYO (a) and (b) PCA in BHI. Effect of Pt deposition time is studied. Comparison with Pt disk (diameter 1mm) is shown. The calibration curves of LIG with 0.1~100 uM PYO (c) and (d) PCA in BHI, extracted from peak analysis of the SWV data. Effect of LIG storage (air vs. nitrogen environment; 3 days) compared to freshly printed LIG is studied, showing high stability of LIG electrodes.

617

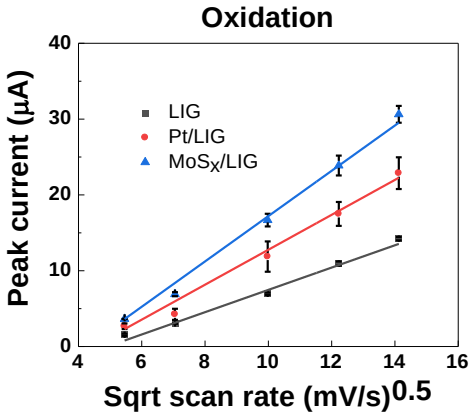

Figure S4. The peak current values extracted from the CV data vs. square root of the scan rate for LIG, Pt/LIG and MoS_x/LIG. This data is used to calculate the electrochemically active surface area (ECSA). The lines show the linear fit to the experimental data.

618

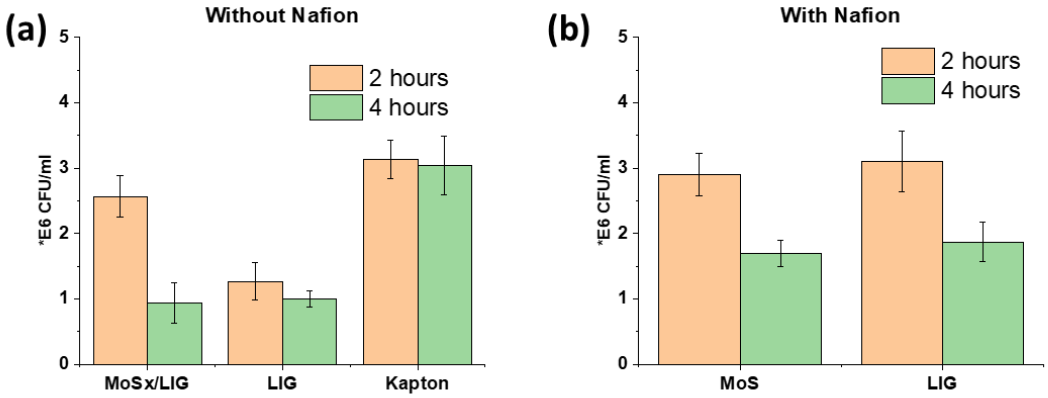

Figure S5. Studying viability of bacteria (*E. coli*) on LIG and MoS_x/LIG surface compared to Kapton sheet (control) after 2 hours and 4 hours before (a) and after (b) coating with Nafion.

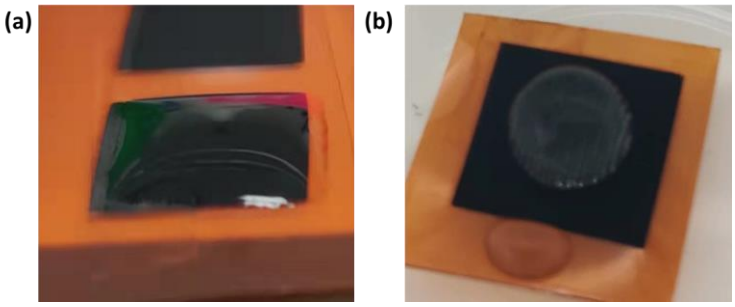

Figure S6. The image of LIG before coating with Nafion (a) and after Nafion coating (b) with 20uL of bacterial suspension. Surface hydrophobicity increases with addition of Nafion.

619

620

621

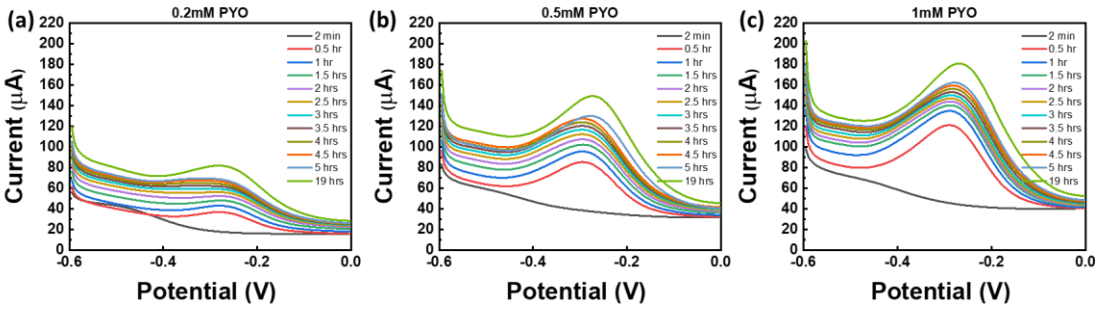

Figure S7. The SWV plots of the Pt/LIG with 5ul of (a) 0.2 mM PYO, (b) 0.5 mM PYO and (c) 1 mM PYO on thin agar layer over time.

622

623

624

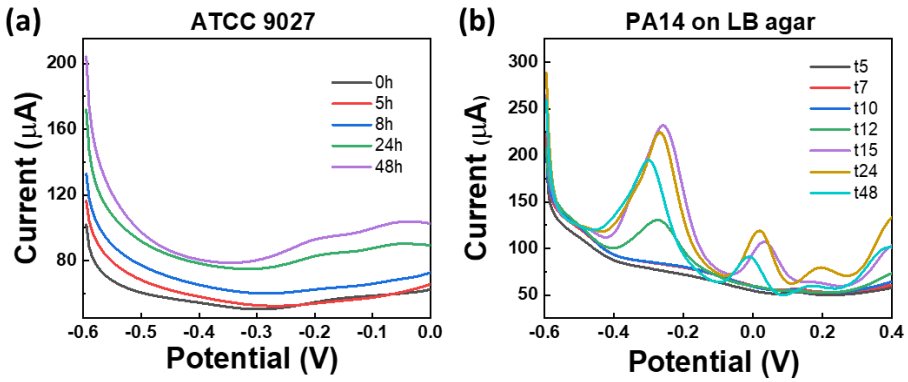

Figure S8. The SWV curves with LB agar as the medium with (a) PA strain ATCC 9027 and (b) PA14 strain over time. The other test conditions (SWV waveform, agar thickness, etc.) are same as the "normal" test configuration described in the main text.