



Supplementary Materials

Fabrication of Enzyme-Free and Rapid Electrochemical Detection of Glucose Sensor Based on ZnO Rod and Ru Doped Carbon Nitride Modified Gold Transducer

Habibulla Imran ^{1,2}, Asrar Alam ¹, Venkataraman Dharuman ^{2,*} and Sooman Lim ^{1,*}

¹ Department of Flexible and Printable Electronics, LANL-JBNU Engineering Institute, Jeonbuk National University, Jeonju 54896, Korea; imranh091@gmail.com (H.I.); asrarlm0@gmail.com (A.A.)

² Molecular Electronics Laboratory, Department of Bioelectronics and Biosensors, Science Campus, Alagappa University, Karaikudi 630004, India

* Correspondence: dharumanudhay@yahoo.com (V.D.); smlim@jbnu.ac.kr (S.L.)

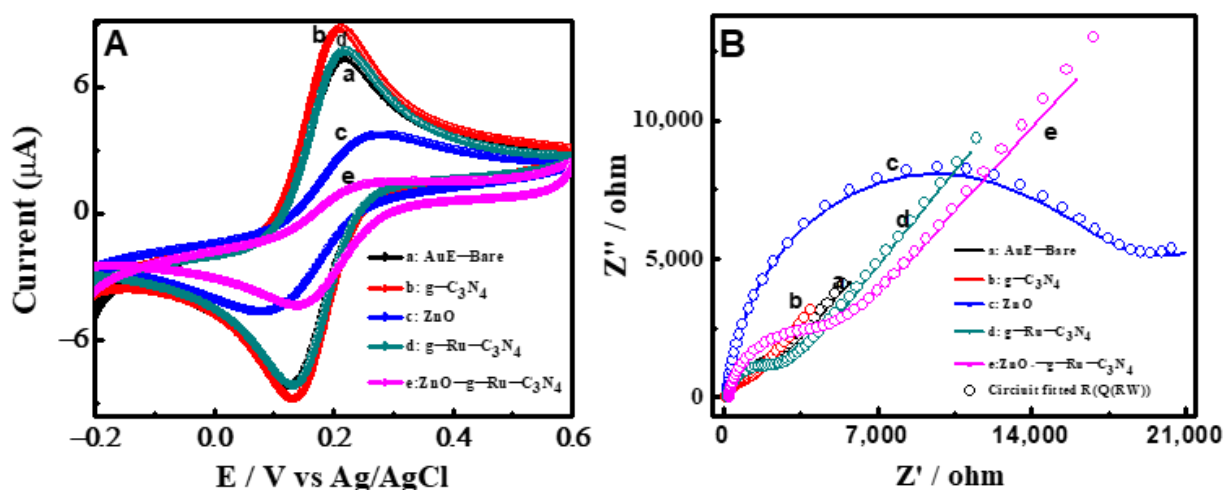


Figure S1. CV (A) and EIS (B) behaviors of AuE (curve a), AuE-g-C₃N₄(curve b), AuE-ZnO (Curve c), AuE-g-Ru-C₃N₄ (curve d) and AuE-ZnO-g-Ru-C₃N₄. Measurements are made in presence of [Fe(CN)₆]^{3-/4-} in PBS (pH 7.4).Star line: [R(Q(RW))] circuit fit data.

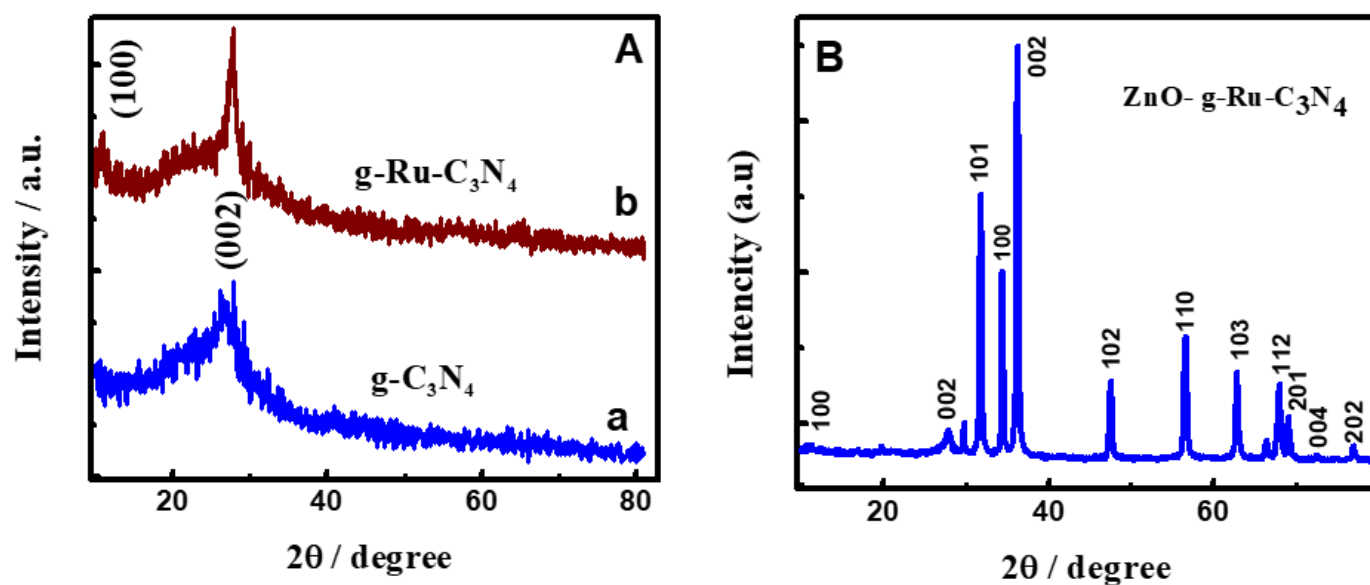


Figure S2. XRD pattern (A) of g-C₃N₄ (curve a), g-Ru-C₃N₄ (curve b), and ZnO-g-Ru-C₃N₄ (B).

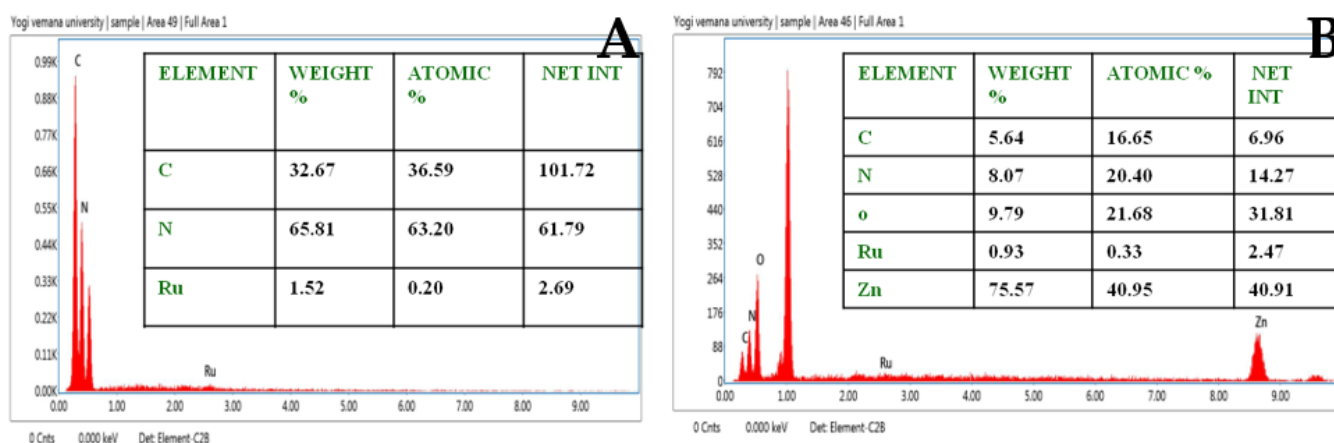


Figure S3. Energy dispersive X-ray (EDX) analyses of Ru-doped g-C₃N₄ (A) and ZnO-g-Ru-C₃N₄ (B).

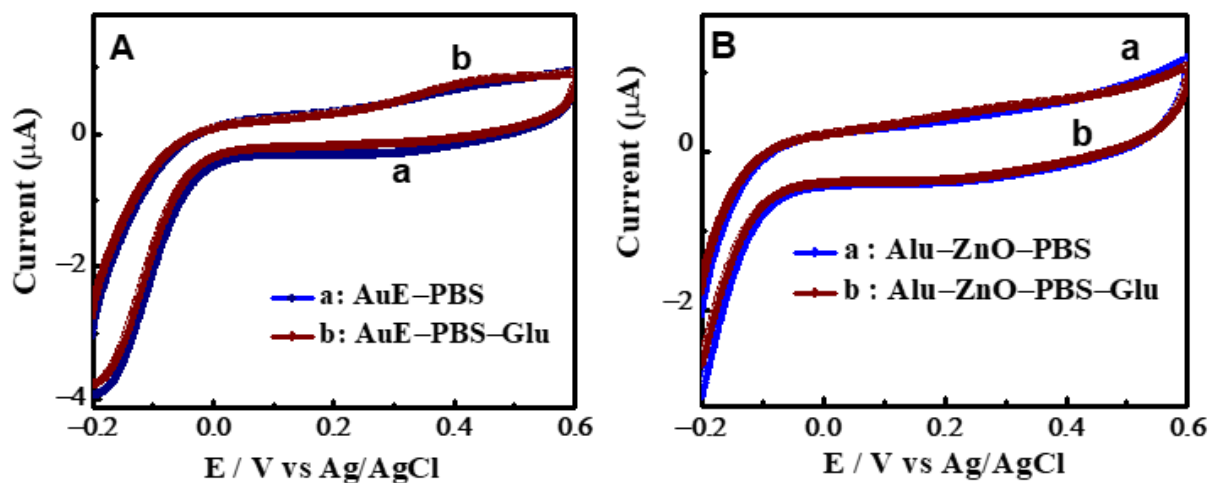


Figure S4. CV behavior of unmodified gold electrode (A) and ZnO (B) modified electrode in the absences (curve a) and presences (curve b) of 1 mM glucose in PBS at a scan rate of 50 mV s^{-1} .

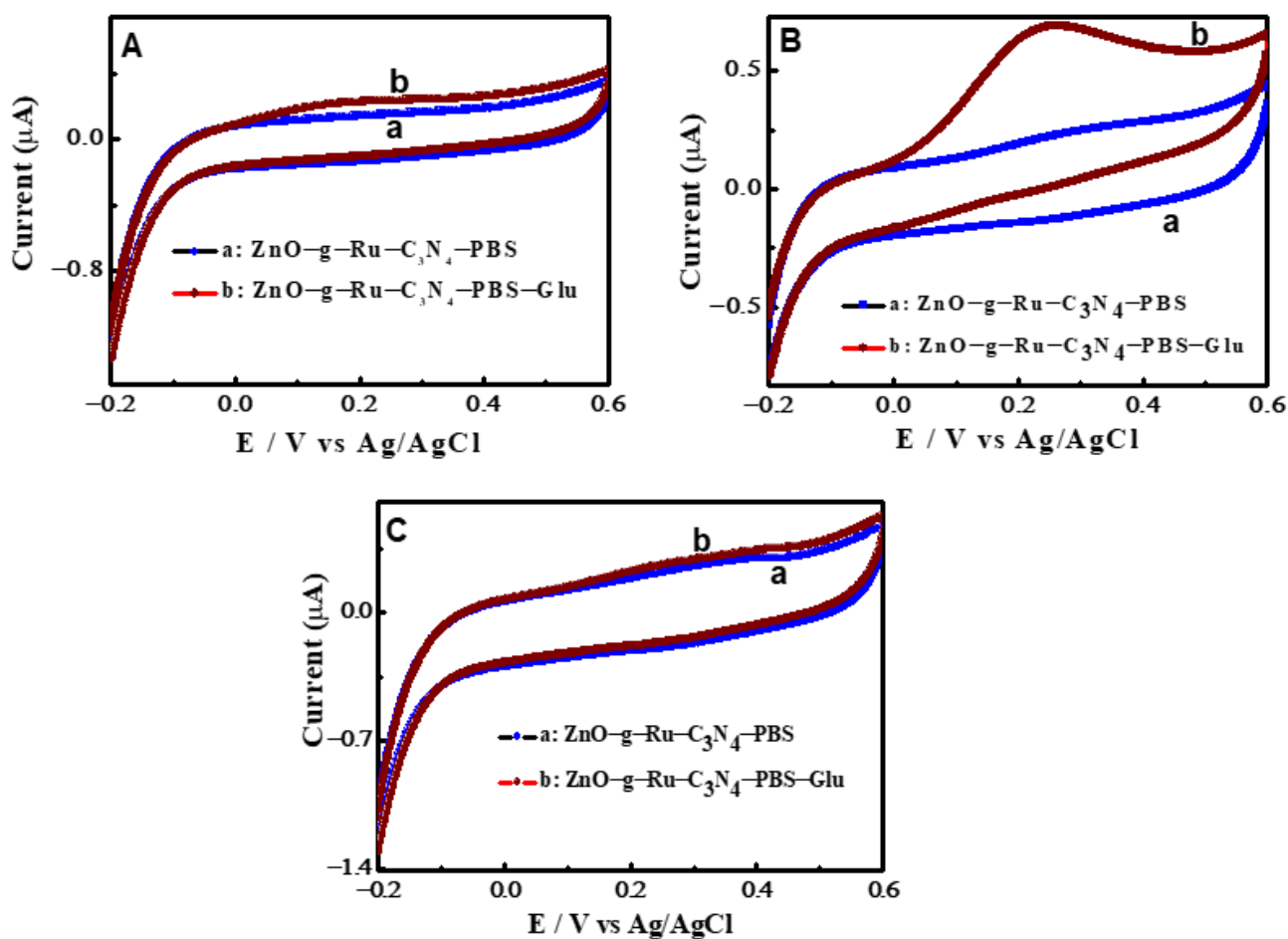


Figure S5. Effect of different ratio of g-Ru-C₃N₄ and ZnO mixture (ratio 1:1 (A), 1:2 (B) and 2:1 (C)) used for AuE modification and used for the glucose sensing. Measured in PBS in the absences (curve a) and presences (curve b) of 1 mM glucose at a scan rate 50 mV s^{-1} .

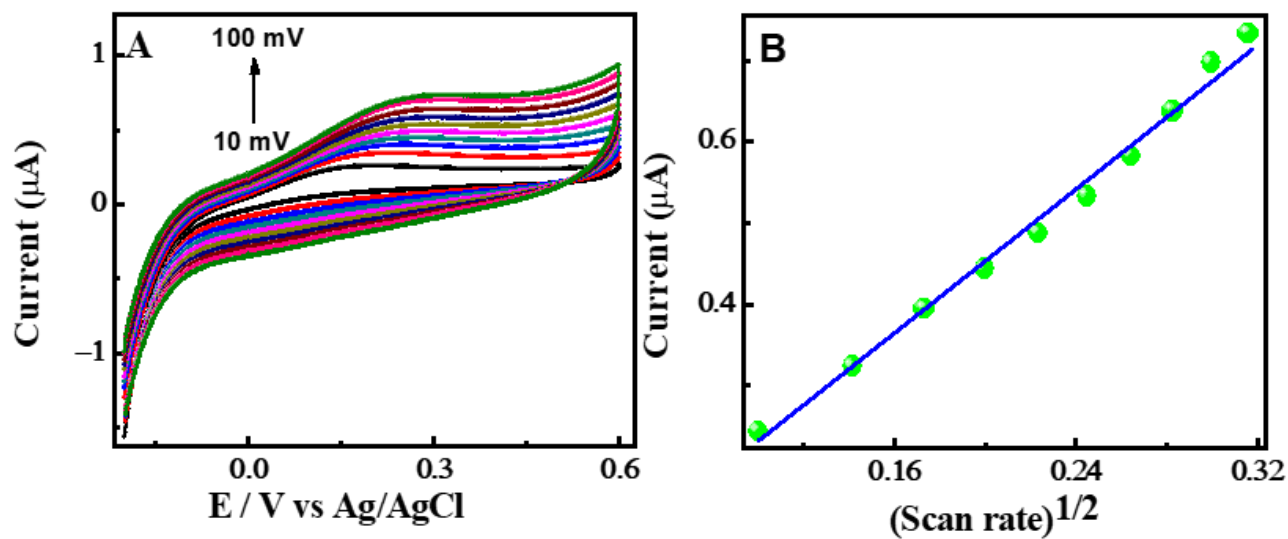


Figure S6. (A) Effect of varying scan rate on the CV behavior of ZnO-g-Ru-C₃N₄. (B) Corresponding plots of (scan rate)^{1/2} versus current.

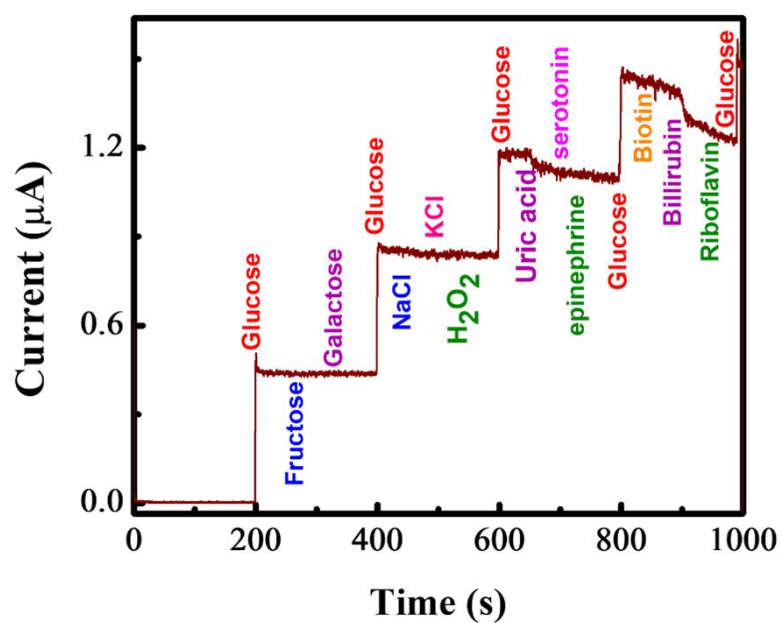


Figure S7. Selective sensing of glucose with the potential interferences are fructose, galactose, riboflavin, billurubin, biotin, NaCl, KCl, H₂O₂, uric acid, serotonin and epinephrine with the concentration of 0.1 mM in PBS.

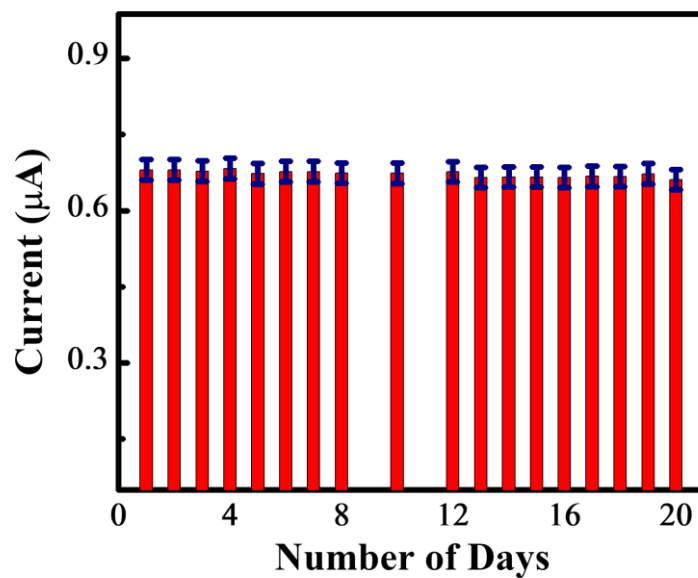


Figure S8. Study of stability of ZnO-g-Ru-C₃N₄ modified electrode monitored voltammetrically in presence of 1 mM glucose in PBS. Anodic peak current is plotted against Number of days.

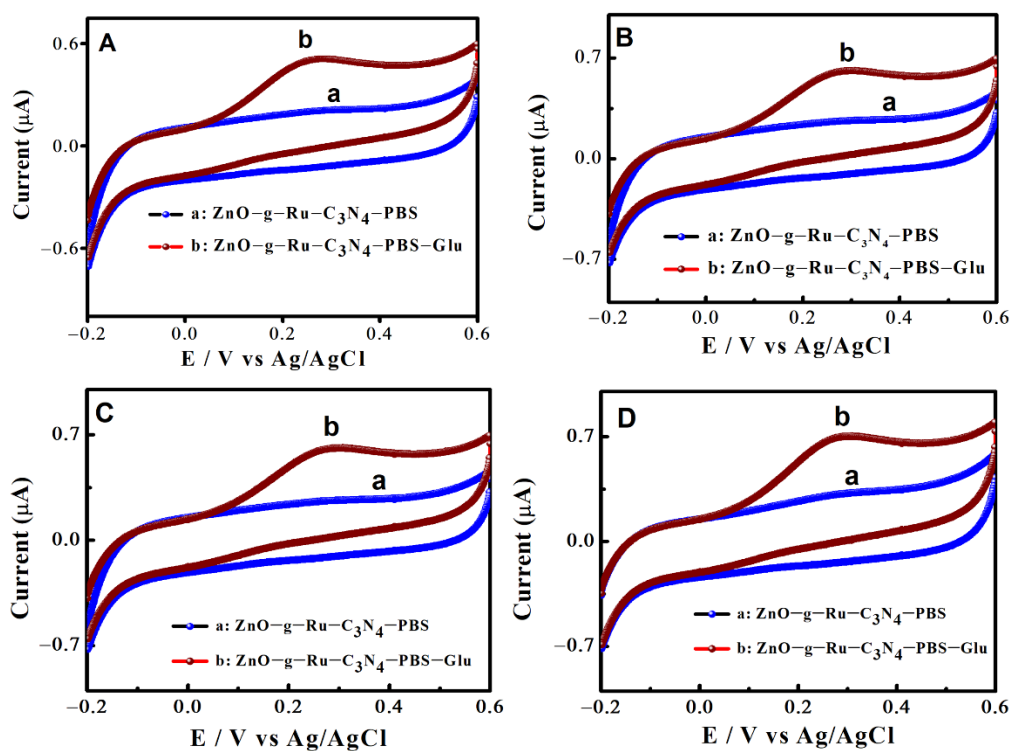


Figure S9. Reproducibility data obtained on using four different gold electrodes of similar activity for modifying with ZnO-g-Ru-C₃N₄. Measured in PBS in the absences (curve a) and presences (curve b) of 1 mM glucose at a scan rate of 50 mV s⁻¹.

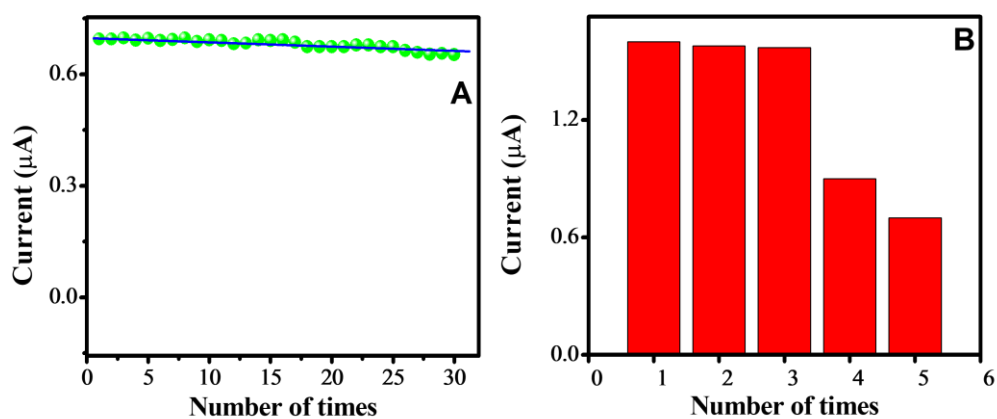


Figure S10. Reusable single electrode is measured in PBS (A) in the presences of 1 mM glucose at a scan rate of 50 mV s^{-1} . (B) Blood serum.

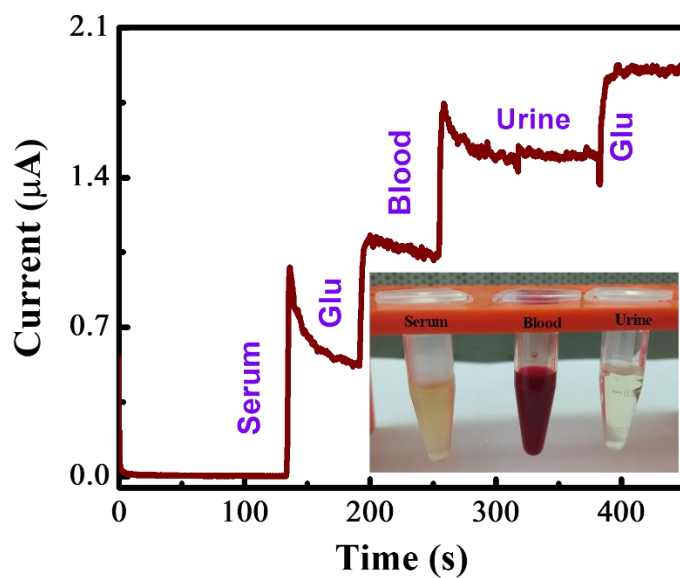


Figure S11. Developed sensor device practically tested in human blood, blood serum and urine samples.