

Enzyme free detection of creatinine as a kidney dysfunction biomarker using TiO₂ flow through membrane

Nilem Khaliq^{1,3,5}, Ghafar Ali^{2*}, Muhammad Asim Rasheed^{1*}, Maaz Khan², Wazir Muhammad⁴, Patrik Schmuki³, Shafqat Karim²

¹Department of Physics and Applied Mathematics, Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad 45650, Pakistan

²Nanomaterials Research Group (NRG), Physics Division, PINSTECH, Islamabad 44000, Pakistan

³Department of Materials Science and Engineering, University of Erlangen-Nuremberg, Martensstrasse 7, D-91058 Erlangen, Germany

⁴Department of Physics (Medical Physics – CAMPEP accredited), Charles E. Schmidt College of Science, Florida Atlantic University (FAU), Boca Raton, FL 33431, USA

⁵Department of Physics, Women University Swabi, Swabi, Khyber Pakhtunkhwa. Pakistan

* E-mail: ghafarali@kaist.ac.kr,

masimr22@gmail.com

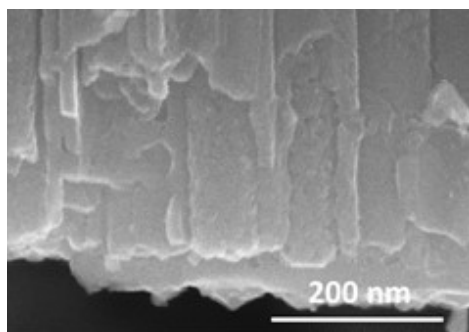


Figure S1: FESEM image showing cross-sectional views of TNTs near bottom side.

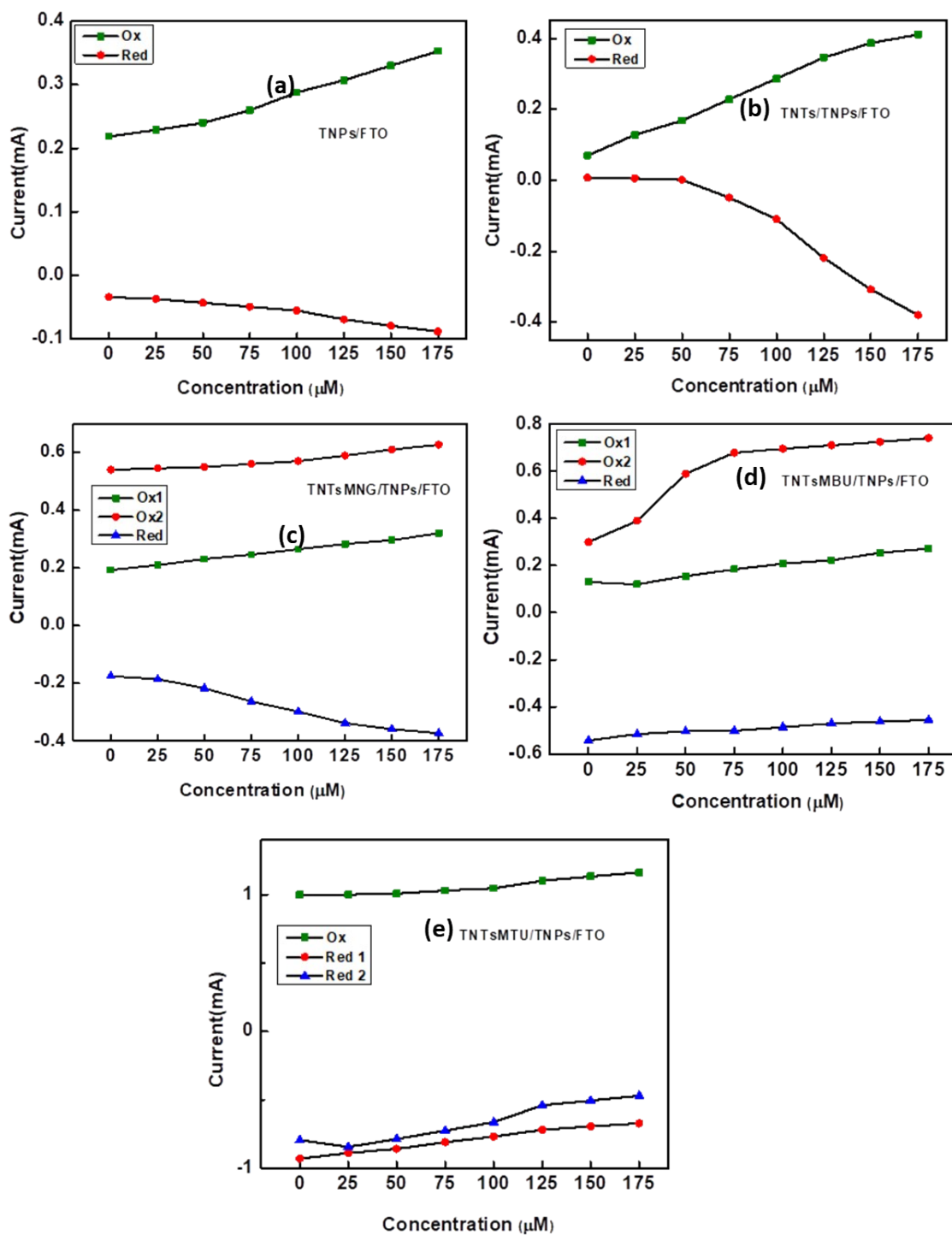


Figure S2: Linear response plot for varying creatinine concentration vs. redox peaks for (a) TNPs/FTO, (b) TNTs/TNPs/FTO, (c) TNTsMNG/TNPs/FTO, (d) TNTsMBU/TNPs/FTO, and (e) TNTsMTU/TNPs/FTO.

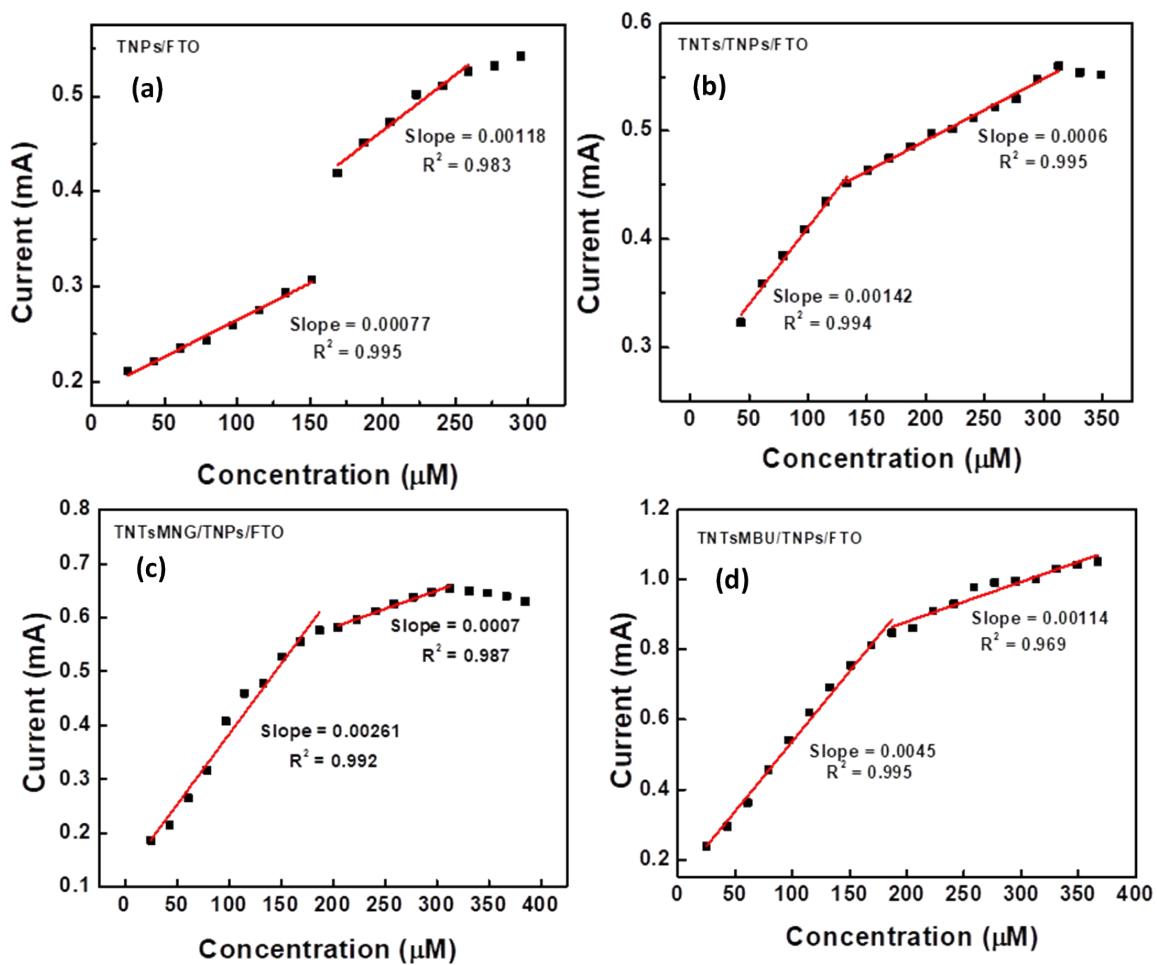


Figure S3: Linear Fitting of calibration curves of (a) TNPs/FTO, (b) TNTs/TNPs/FTO, (c) TNTsMNG/TNPs/FTO, and (d) TNTsMBU/TNPs/FTO.

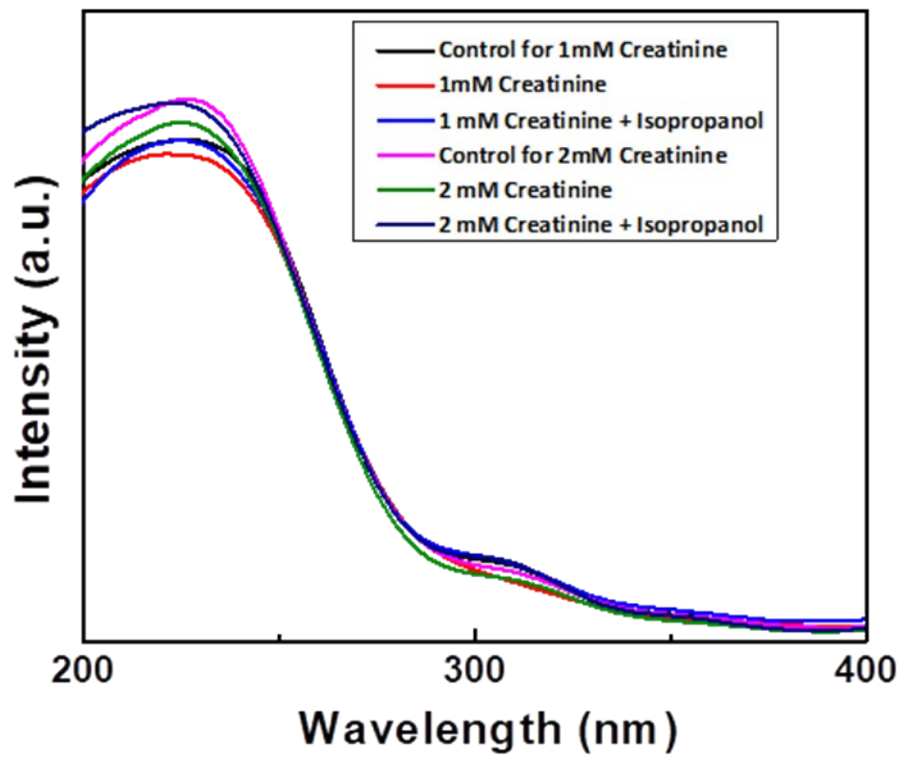


Figure S4: UV-Visible spectra of creatinine in the presence and absence of isopropanol.