Supplementary Materials: Investigation of the Influence of the As-Grown ZnO Nanorods and Applied Potentials on an Electrochemical Sensor for In-Vitro Glucose Monitoring

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The absorbance spectrum was measured to support SEM images and to determine the exciton peak, gives an indication of the band gap of the as-grown ZnO NRs, as can be seen in Figure S1. The exciton peak appeared at 379 nm and the shoulder of the peak continued until 387 nm. Wavelengths below the band gap of ZnO NRs, which is 3.37 eV, are not getting absorbed by the material. They are either transmitted or reflected, so there is no absorbance spectrum until the energy of light reaches the band gap of ZnO NRs. In Beer-Lambert law:

$$I = I_o\, e^{-\alpha x} \tag{S1}$$

where I is the transmitted intensity, I_o is the incident intensity, α is the absorption coefficient, and x is the thickness of the material. Absorbance can be calculated by manipulating the above equation, as follows:

$$A = \log_{10}\left(\frac{I_o}{I}\right). \tag{S2}$$

Herein, when the transmitted intensity is equal to the incident one, I_o/I = 1 and log 1 is zero, which means no absorbance. Figure S2 shows the Raman spectrum that was measured for the as-grown ZnO NRs on Si/SiO_2/Au. Lattice vibration (Phonon vibration) of the ZnO NRs can be studied using spectroscopy since Raman spectroscopy can be explained as an inelastic scattering of monochromatic light (usually laser) in the material. The highest peak appeared at 442 cm^{-1}, and it can be assigned as E_2 or (high mode), while the other peak appeared at 337 cm^{-1}, and that can be assigned as a second-order phonon. The weakness of the peak can be explained by the oxygen vacancies during the growth process of the as-grown ZnO NRs, and it can be an indicator of the high current obtained using the immobilized surface of the ZnO NRs as a working electrode.

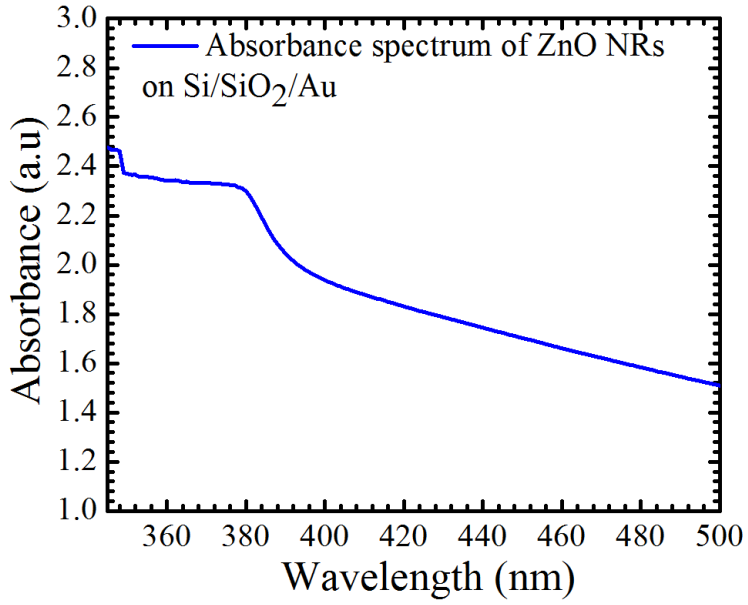

Figure S1. Absorbance spectrum of the as-grown ZnO NRs on Si/SiO_2/Au.

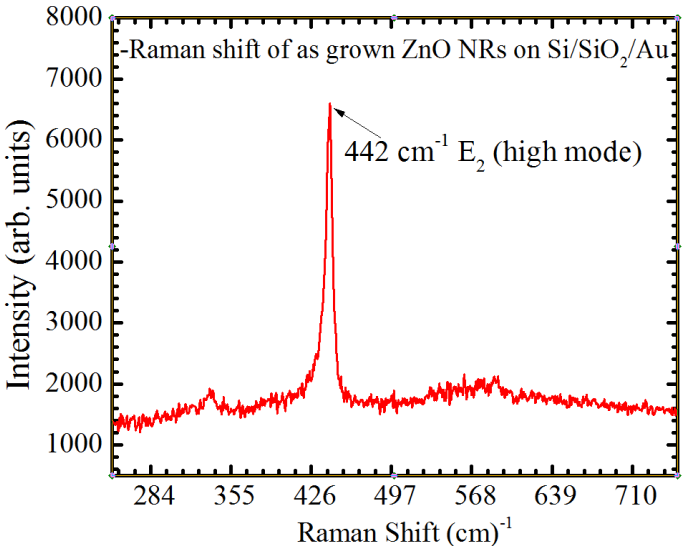

Figure S2. Raman shift of the as-synthesized ZnO NRs on Si/SiO2/Au.