

Highly selective wide linear-range detecting glucose biosensors based on aspect-ratio controlled ZnO nanorods directly grown on electrodes

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Amperometric glucose biosensors have been fabricated using aspect-ratio (AR) controlled zinc oxide nanorods (ZnO NRs) grown directly on Si/Ag electrodes, which showed a high performance in terms of selectivity, response time, linear range and repeatability. Especially, the glucose biosensor with AR = 60 demonstrates the highest sensitivity of 110.76 $\mu\text{A}/\text{mMcm}^2$ and a wide linear range of 0.01–23.0 mM with ultrafast response time (< 1 s). Such high performance is due to more immobilization on the well aligned ZnO NRs arrays and direct electron conduction between the NRs and the electrodes. Furthermore the biosensor also showed a promising application for selectively detecting glucose in urine, which is useful for detecting renal glycosuria.