

Supporting Information

Construction of titanium dioxide nanorod/graphite microfiber hybrid electrodes for high performance electrochemical glucose biosensor

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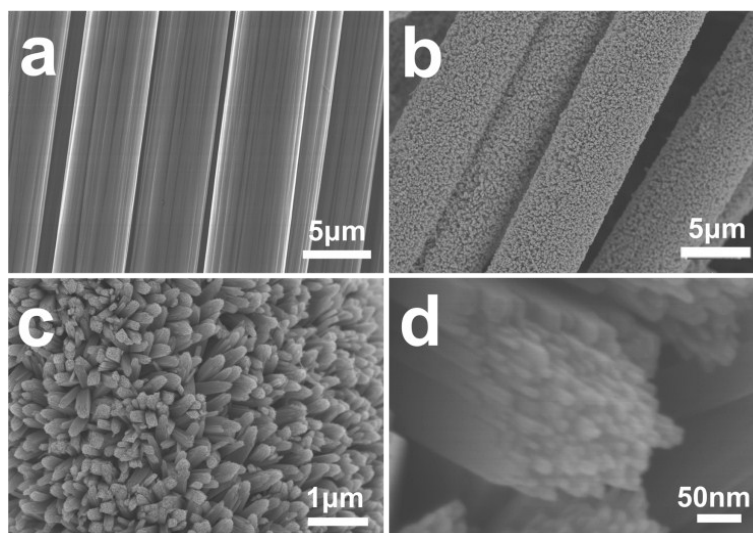


Figure S1. SEM images of graphite microfiber (a), TiO₂ nanorod/graphite microfiber (b) and high resolution images of TiO₂ nanorods on surface of graphite microfiber (c and d).

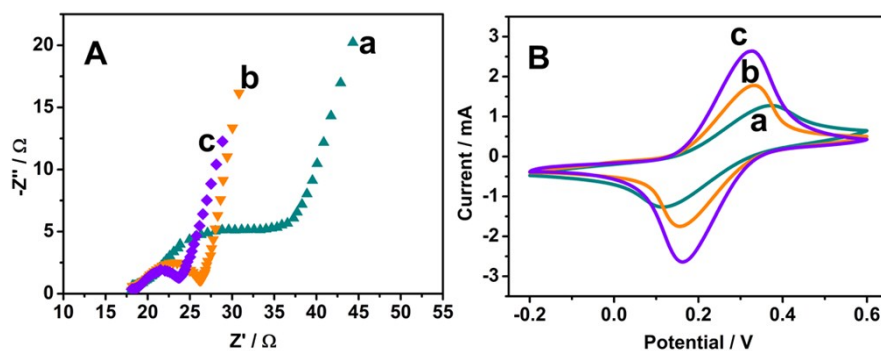


Figure S2. (A) Nyquist plot of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode (a), chitosan/TiO₂ nanorods/graphite microfiber electrode (b) and TiO₂ nanorod/graphite microfiber electrode(c); (B) CV of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode (a), chitosan/TiO₂ nanorod/graphite microfiber electrode (b) and TiO₂ nanorod/graphite microfiber electrode(c). (A) and (B) were both recorded in 0.01 M PBS containing 5mM K₃[Fe(CN)₆]/K₄[Fe(CN)₆] and 0.1 M KCl (pH 7.4).

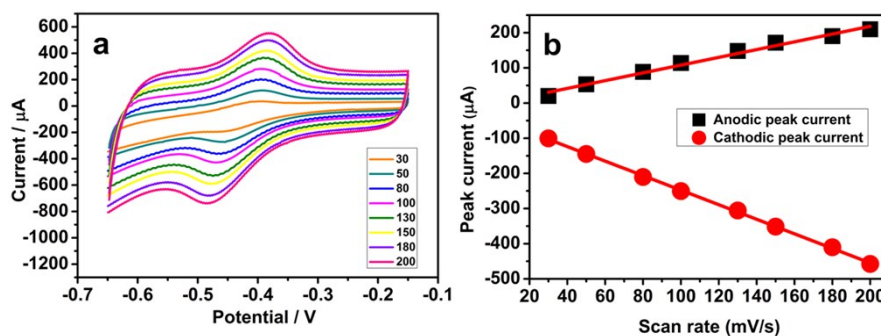


Figure S3. CV of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode in 0.1 M pH 7.0 N₂-saturated PBS at different scan rate of 30, 50, 80, 100, 130, 150, 180, 200mV s⁻¹ (from inside to outside)(a); Plots of anodic and cathodic peak currents vs. scan rate(b).

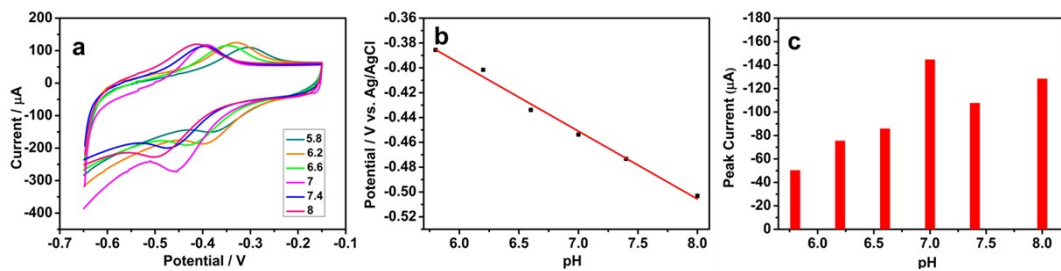


Figure S4. CV of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode in N₂-saturated 0.1 M PBS with different pH values of 5.8, 6.2, 6.6, 7.0, 7.4 and 8.0 at a scan rate of 50 mV s⁻¹ (a); plot of formal potentials vs. pH (b); plot of peak currents vs. pH (c).

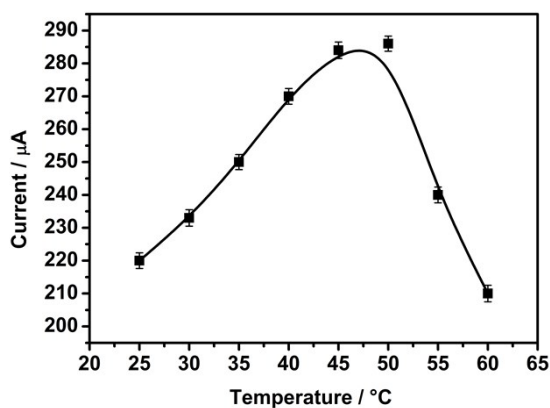


Figure S5. Plots of current response vs. temperature of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode in N₂-saturated 0.1 M PBS.

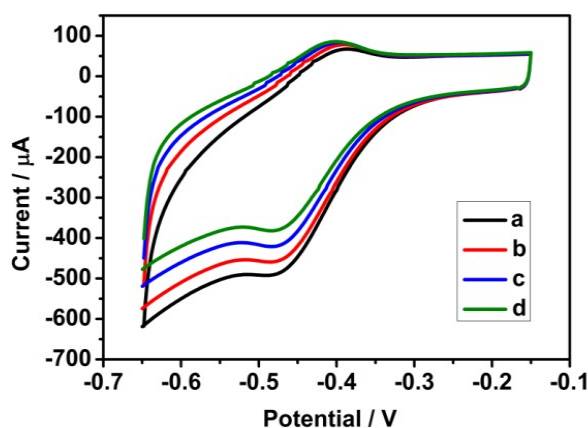


Figure S6. CV of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode in 0.1 M O₂-saturated PBS (pH 7.0) including 0, 1.0, 3.0 and 5.0 mM glucose (a-d) at a scan rate of 50 mV s⁻¹.

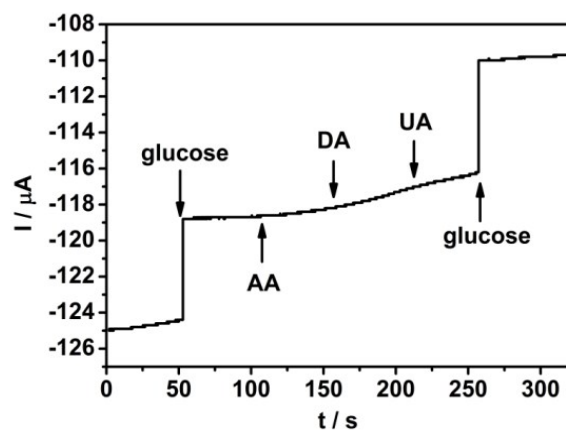


Figure S7. Amperometric response of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode to 0.5mM glucose, 0.5mM AA and 0.5mM UA in 0.5 M pH 7.0 PBS at -0.50 V applied potential.

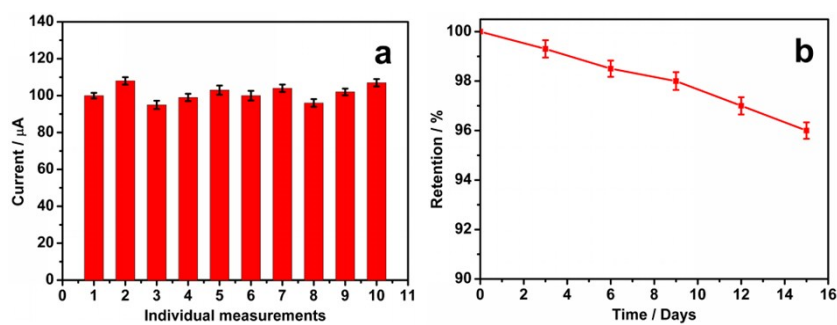


Figure S8. (a) Reproducibility and (b) stability of GOx/chitosan/TiO₂ nanorod/graphite microfiber electrode at a scan rate of 50 mV s⁻¹ from the response to 100 μM glucose.

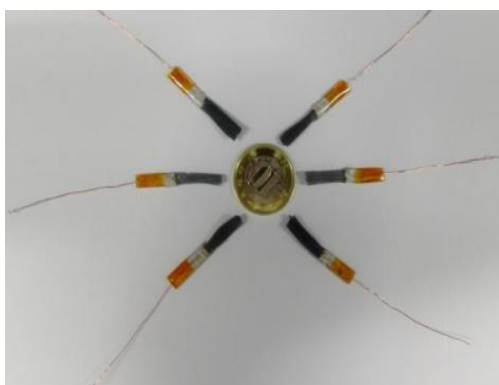


Figure S9. The optical photograph of the working electrodes.

Electrode	Applied potential (V)	Sensitivity (mA M ⁻¹ cm ⁻²)	Detection limit (mM)	Ref
GOx/chitosan/TiO ₂ nanorod/ graphite microfiber	-0.5	18.6	0.0022	This work
GOx/SnS ₂ /Nafion/GCE	-0.45	7.6	0.01	46
GOx/CNx-MWNTs/GCE	-0.5	13	0.01	13
GOx/Pt/FCNA/GCE	-0.08	6.0	0.3	47
NPG/PEDOT/GOx	0.2	7.3	0.01	48
GOx/NiO hollow spheres/GCE	0.35	3.4	0.047	49
MSCF/GOD/Nafion/GCE	-0.4	1.8	0.035	34

Table S1 Comparison of analytical performance between GOx/chitosan/TiO₂ nanorod/graphite microfiber and other modified electrodes.

Samples	Referenced Values (mM)	Determined values (mM)	RSD (%)
1	4.50	4.59	2.80
2	4.65	4.71	2.69

Table S2 Glucose detection in human serum using the GOx/chitosan/TiO₂ nanorod/graphite microfiber biosensor.