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Supporting information

In situ fabrication of Ni nanoparticles on N-doped TiO_2 nanowire arrays by nitridation of $NiTiO_3$ for high-sensitivity and enzyme-free glucose sensing

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Calculations

Measurement of glucose concentration in human blood

Amperometric determination of Ni NPs/TiO_xN_y NWAs electrode towards real sample was carried out at in 10 ml NaOH (1 M) solution under stirring at the optimal potential of 0.37 V (vs SCE). As shown in Fig. 5d, the average value of enhanced current with successive twice addition of 100 μl fresh human blood was determined according to the calibration curve. The calculation was shown as below, while ΔI stand for the average enhanced current per 100 μl blood.

ΔI = (12.6 μA + 11.7 μA)/2 = 12.15 μA

According to the calibration curve in Fig 5b, the ΔI is in direct proportion to ΔC. While the ΔC stand for the glucose concentration in test solution. The C_{blood} is the real concentration of glucose in blood.

$I = 2.0612*10^{-4}*C + 0.0582$

$\Delta I = 2.0612*10^{-4}*\Delta C$

ΔC = 58.9 μmol /L

C_{blood} = ΔC*(10ml/100μl) = 5.89 mmol / L

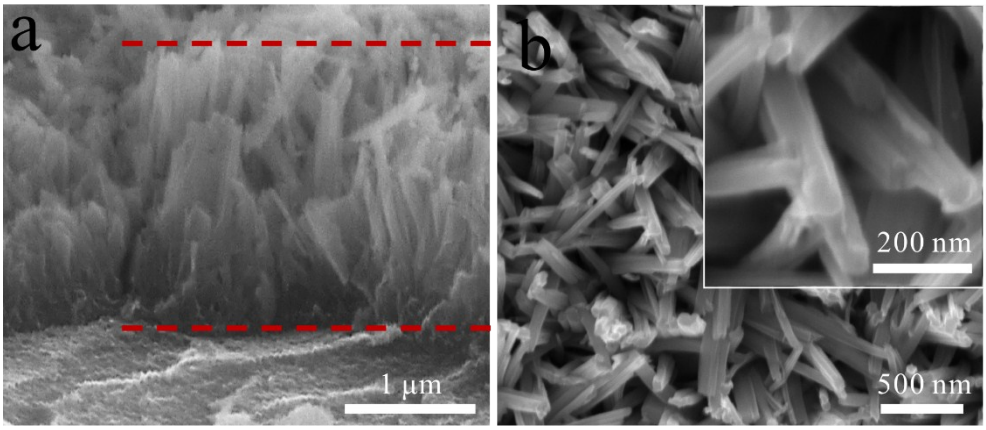

Fig. S1. (a) The SEM images of side view of Na_2TiO_3 NWA. (b) The SEM images of TiO_xN_y NWAs

The TiO_xN_y NWAs was prepared by immersing Na_2TiO_3 in 1 M HCl for overnight and subsequently washed and annealed in the NH_3 at 500 ^oC for 3 h.

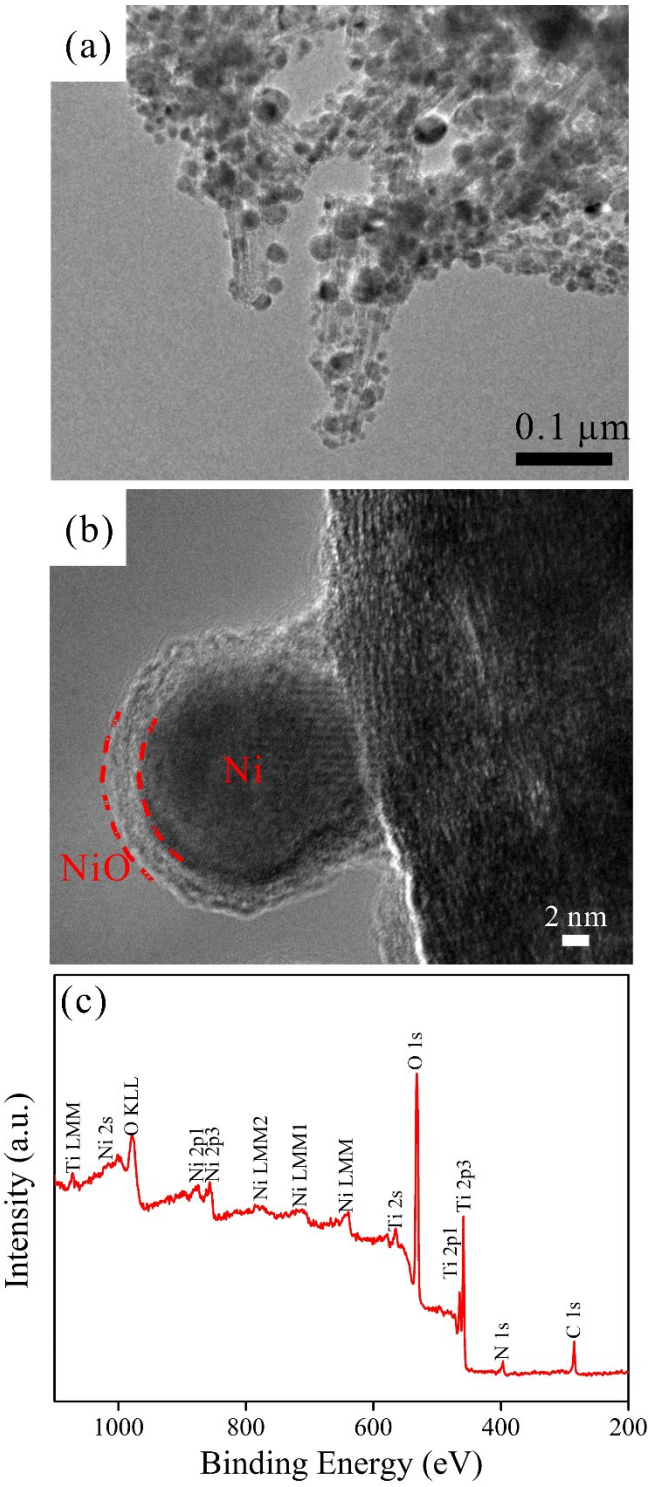

Fig. S2. (a) Low resolution TEM image of the Ni NPs/TiO_xN_y NWAs; (b) HR-TEM images of Ni NPs/TiO_xN_y NWAs**.** (c) Corresponding survey XPS spectra.

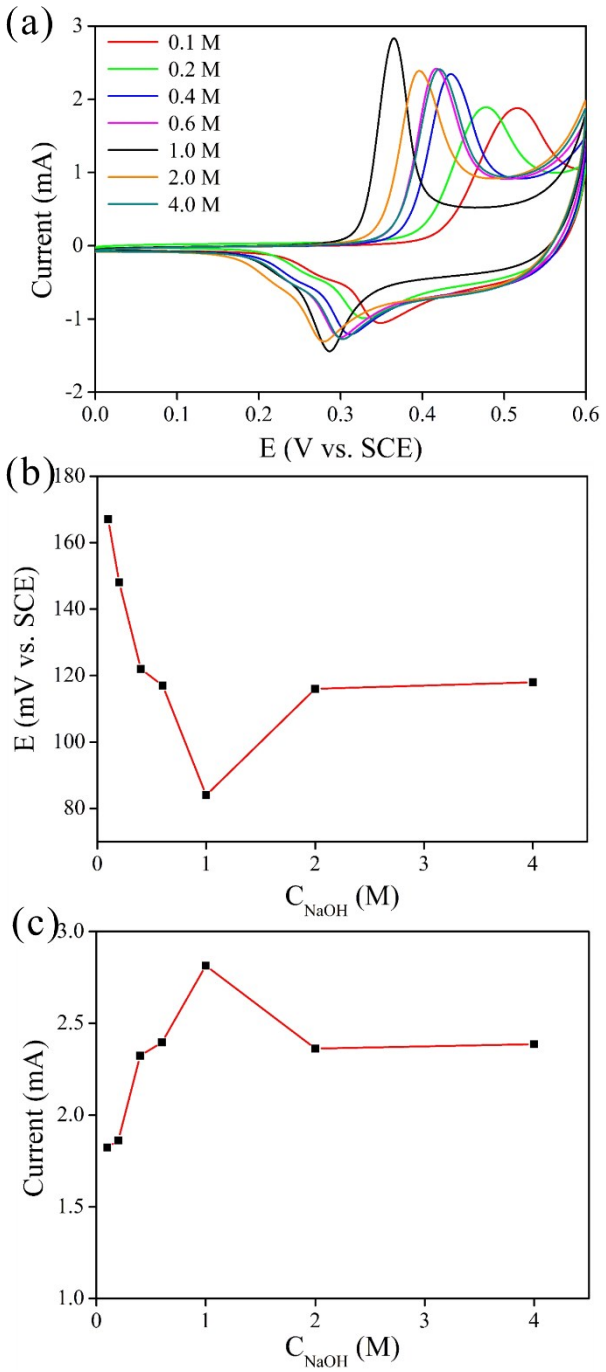

Fig. S3. (a) CVs of Ni NPs/TiO_xN_y NWAs at different concentration of NaOH from 0.1 to 4 M; (b) and (c) Corresponding peak potential separation (∆Ep) and anodic peak current.

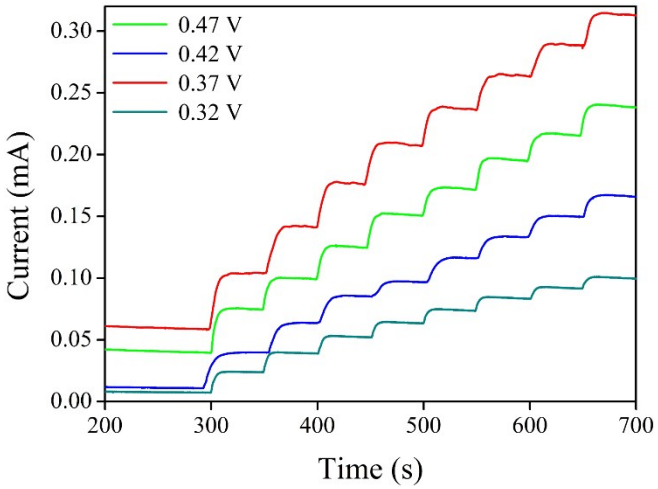

Fig. S4. Amperometric response of the Ni NPs/TiO_xN_y NWAs electrode by successive adding 1 mM glucose in 1 M NaOH at various applied potentials (V vs SCE).

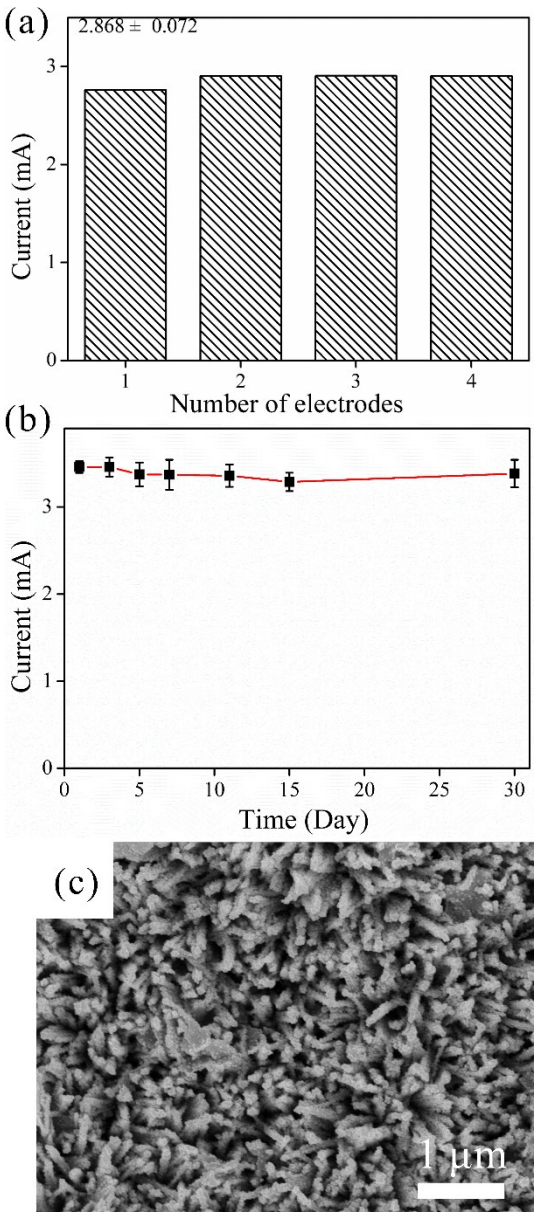

Fig. S5. (a) Anodic peak currents of CVs of four different Ni NPs/TiO_xN_y NWAs electrodes, in 1 M NaOH containing 2 mM of glucose at a scan rate of 50 mV s^{-1}. (b) Stability of the Ni NPs/TiO_xN_y NWAs electrodes stored under ambient conditions. Peak current was measured in 1 M NaOH containing 2 mM of glucose (1, 3, 5, 7, 11, 15, 30 day). (c) The SEM image of the Ni NPs/TiO_xN_y NWAs after 30 days.

Table S1 Atomic ratio of different elements (Ni, Ti, N, O and C) observed in XPS of Ni NPs/TiO_xN_y NWAs.

Sample	Ni	Ti	N	O	C
Ni/TiO_xN_y	3.4	13.2	6.3	62.4	14.7