Supplementary Information for

Metal-Oxide Surface-Enhanced Raman Biosensor Template Towards Point-of-Care EGFR Detection and Cancer Diagnostics

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Fabrication of Q-structure TiO_x

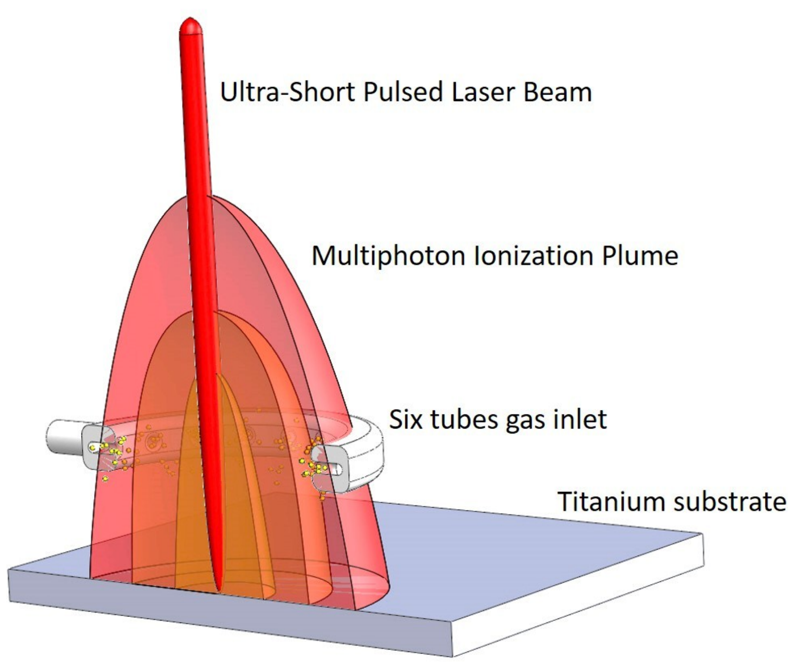

Fig. S1. Schematic illustration of fabrication of the Q-structured TiO_x.

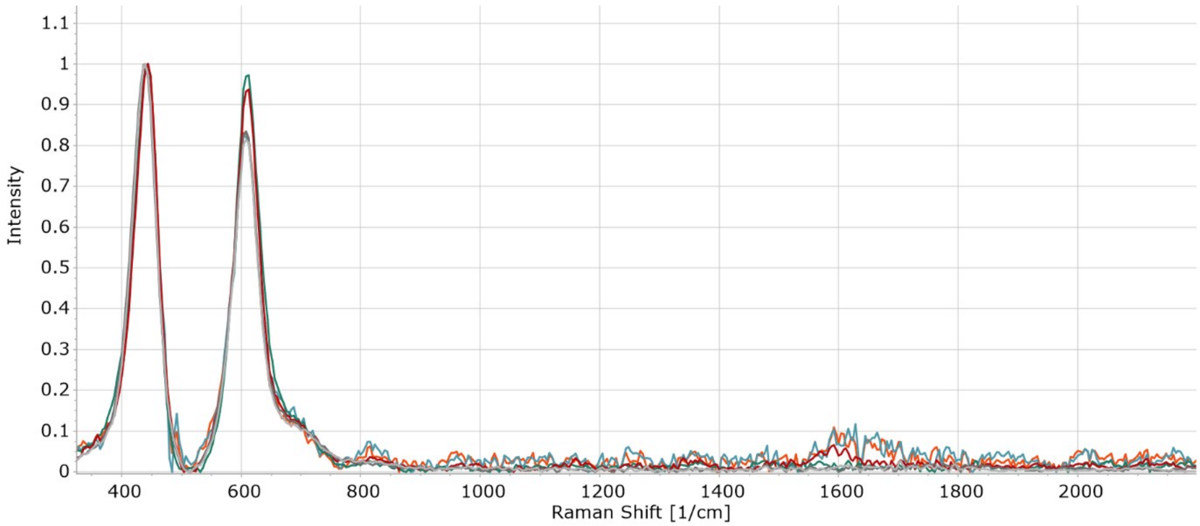

Fig. S2. The stability of the OVs on the Q-structured TiO_x templates have been assessed over exposure to 360 s at 785 nm Raman wavelength and an intensity of 250 mW/µm^2 for 120 cycles. As evident no shift and deterioration on the characteristic peaks of the Q-structured TiO_x have been observed. For better observation of the position of the peaks, the acquired spectrums have been normalized.

Bandgap Calculations

The bandgap of the quantum scaled TiO_2 and TiO_x were calculated based on the Kubelka-Munk (K-M or F(R)) method:

$$F(R) = \frac{(1-R)^2}{2R}$$

where R is the reflectance and F(R) is a function based on extinction coefficient α. the following equation was used to calculate the band gap Eg.

$$\alpha(hv) \approx \mathrm{B}(hv - E_g)^n$$

where E_g is the band gap (eV), h is Planck's constant (J.s), B is absorption constant, v is light frequency (s-1), α is the extinction coefficient and n is the value for specific transition.

Table S1. Characteristic bands observed in breast cancer and corresponding assignment of biomolecules

Raman bands (cm^{-1})	SERS Bands (cm^{-1})	Biomolecules	References
622	622	Phenylalanine	1, 2

Raman bands (cm⁻¹)	SERS Bands (cm⁻¹)	Biomolecules	References
642 828 853 1620	642 809 839 1620	Tyrosine	2, 3
714	714	Polysaccharides	3, 4
742 1083	742 1083	Phospholipid	3, 5
754 1126 1208	754 1126 1220	Protein	3
875 1447 1556	875 1436–1458 1556	Tryptophan	6
897	897	C-O-C str	3
955	971	CH2 rock	3
1002 1028 1103	1002 1035 1103	Phenylalanine	1, 3
1174	1167	Tryptophan, Phenylalanine	6
1230–1282	1230–1282	Amide III	1
1300–1345	1300–1345	Tryptophan, α-helix	3, 6
1404	1404	Glutathione	1
1587	1587	Protein, Tyrosine	3
1603	1603	Tyrosine, Phenylalanine	3, 6
1654	1654	Proteins, Amide I	3

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