

Supporting Information

Synthesis of Uniform Size Rutile TiO₂ Micro-rods by Simple Molten-salt Method and Its Photoluminescence Activity

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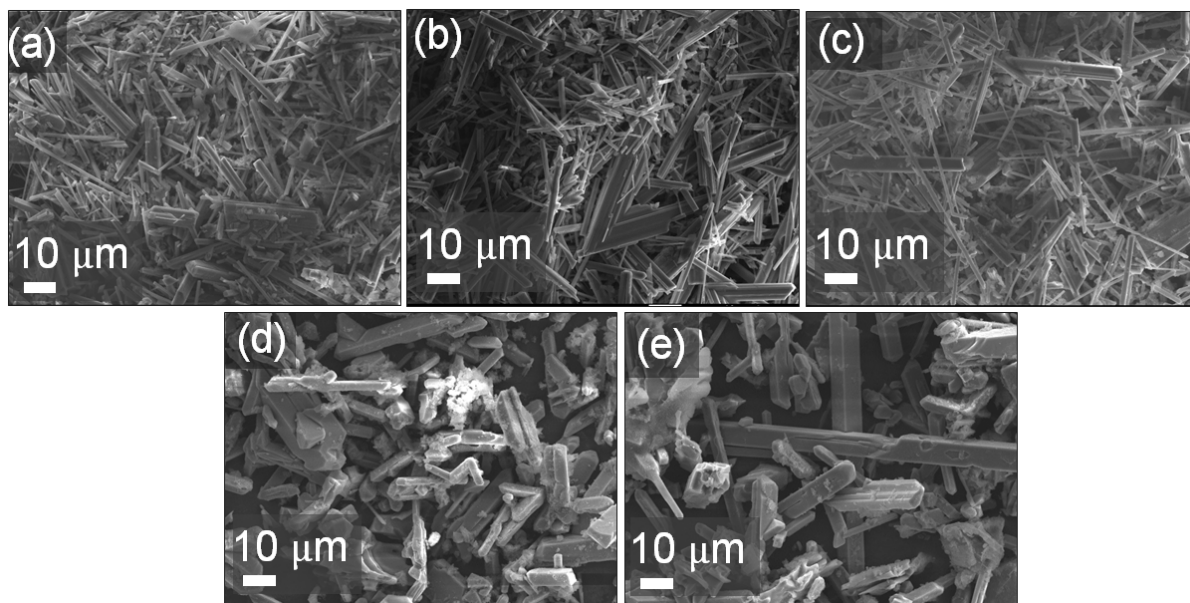


Figure S1. Synthesized rutile TiO_2 micro-rods by changing additives ratio $((\text{NaPO}_3)_6 : \text{Na}_3\text{P}_4\text{O}_7)$ to (a) 4:0, (b) 3:1, (c) 2:2, (d) 1:3 and (e) 0:4 and keeping other precursors ratio constant (rutile : anatase : NaCl = 0.5 : 1.5 : 8).

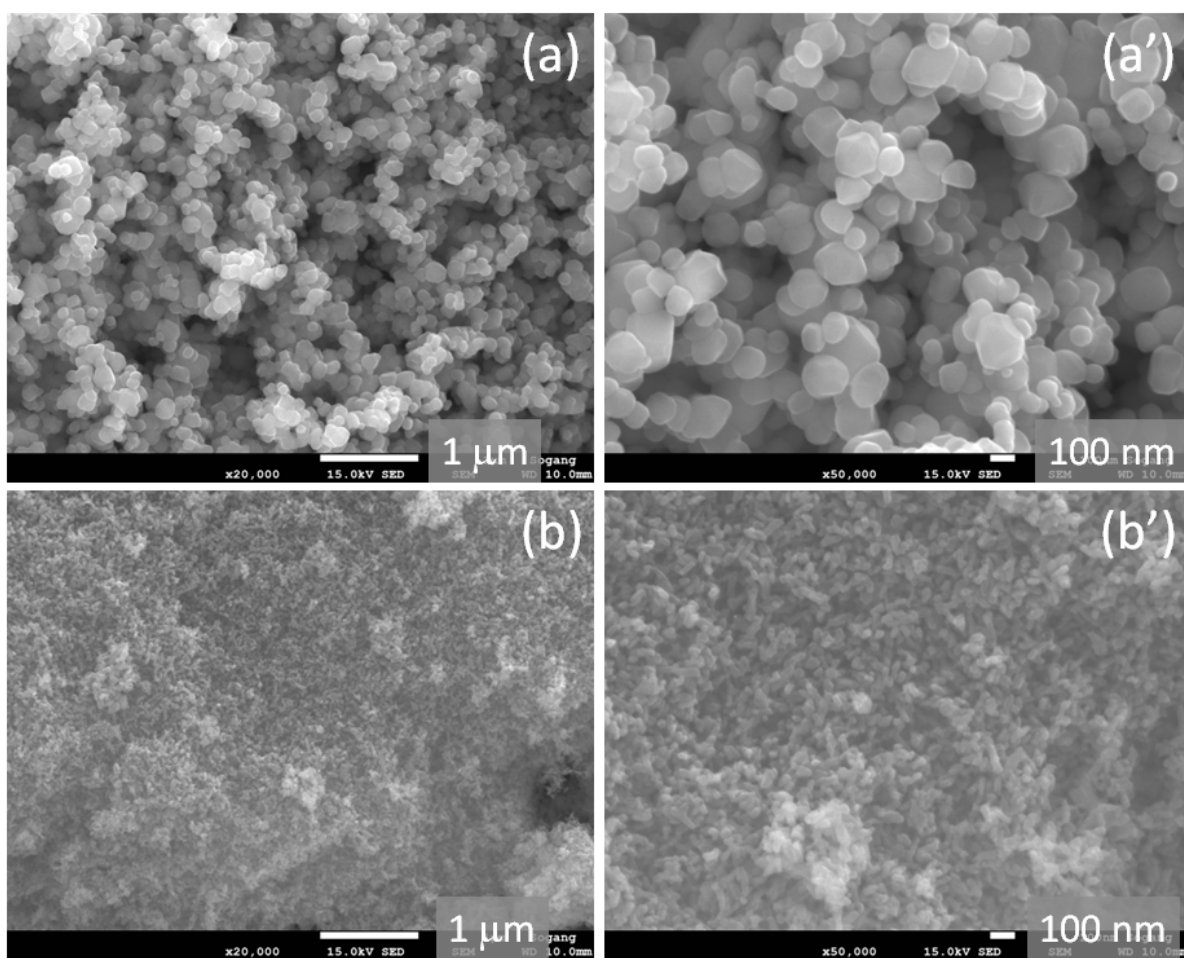


Figure S2. Low and high magnification SEM images of TiO₂ precursors (a, a') anatase TiO₂ and (b,b') rutile TiO₂.

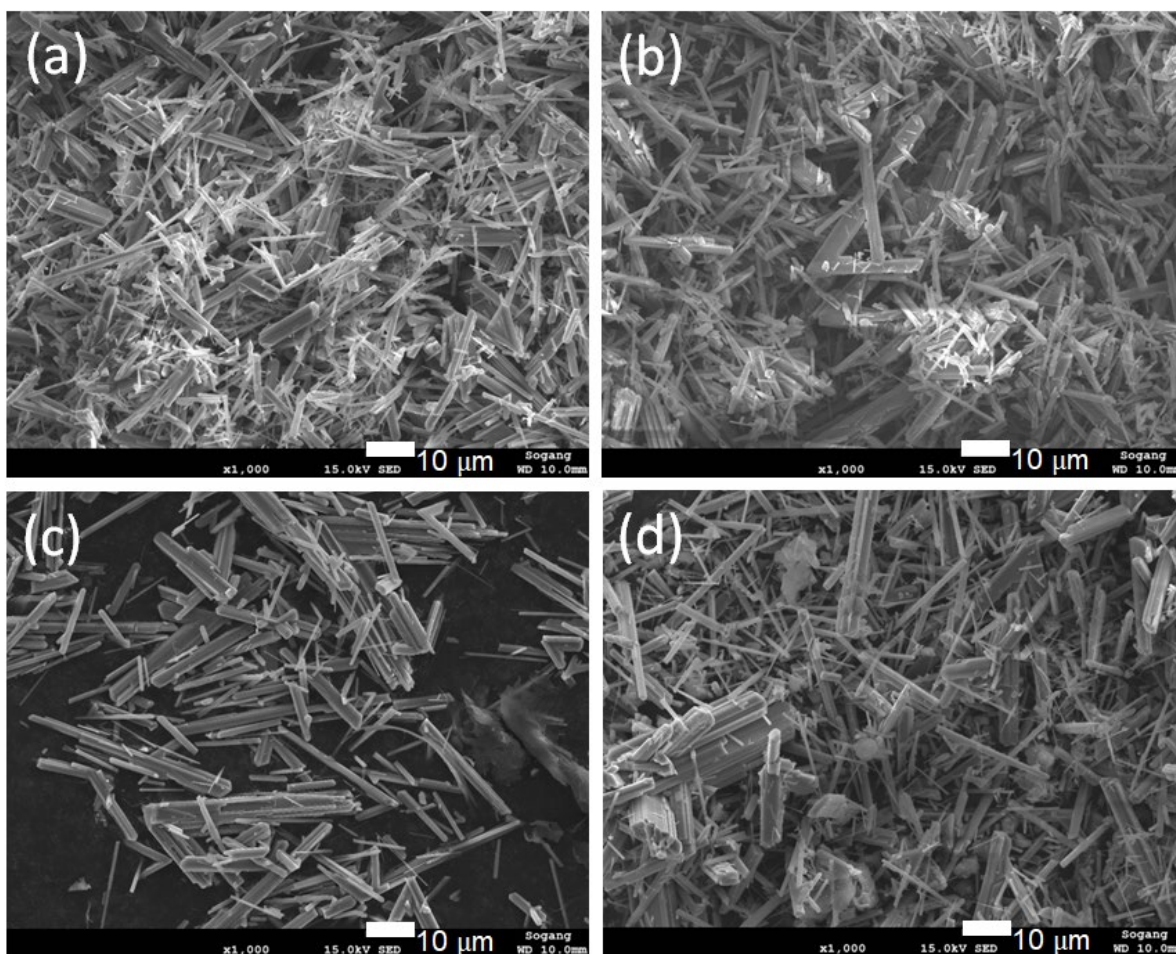


Figure S3. SEM images with lower magnification of rutile TiO₂ micro-rods samples prepared by different ratios of TiO₂(rutile, seed): TiO₂ (anatase) as a precursor (a) 1:1, (b) 1:2, (c) 1:3 and (d) 1:4.

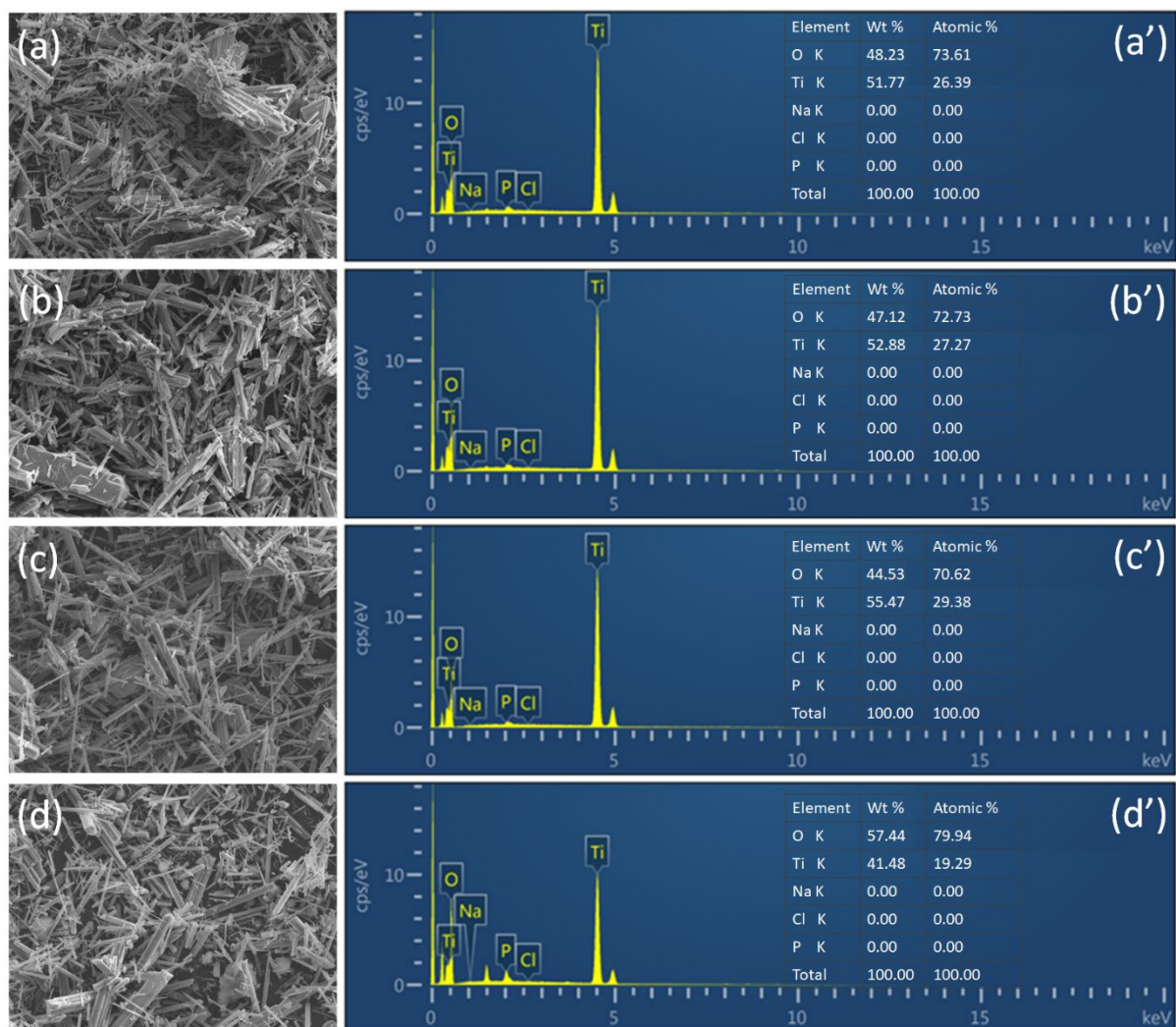


Figure S4. SEM and EDS data of synthesized rutile TiO₂ rods with different ratios of TiO₂ (rutile, seed) : TiO₂ (anatase) as a precursor (a,a') 1:1, (b,b') 1:2, (c,c') 1:3 and (d,d') 1:4.

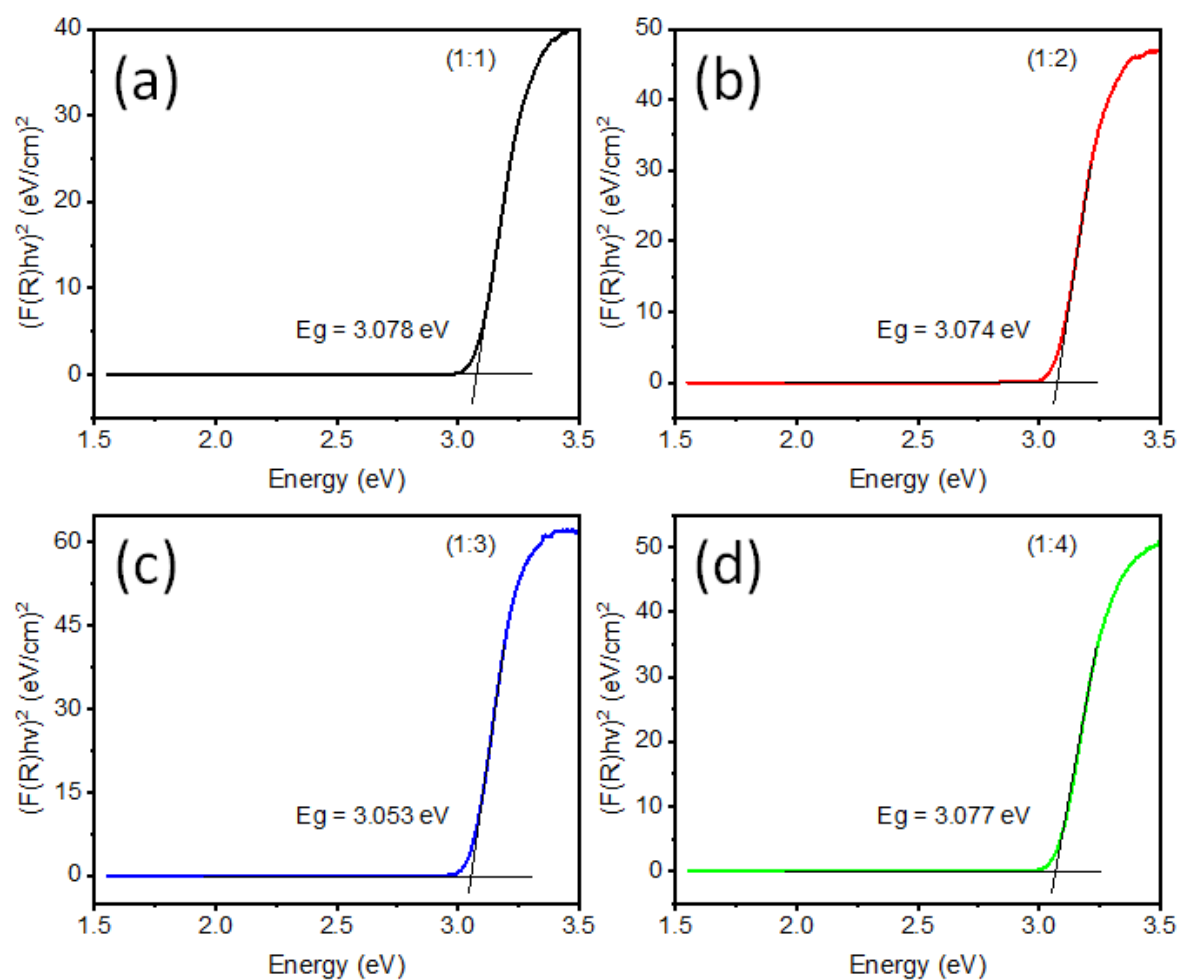


Figure S5. Band gap energy calculation by using Tauc plot method for TiO_2 sample prepared by different ratios of TiO_2 (rutile, seed): TiO_2 (anatase) as a precursor (a) 1:1, (b) 1:2, (c) 1:3 and (d) 1:4.

Table S1. Actual weight and related ratios of precursors used for rutile TiO₂ synthesis by molten salt method.

No	Sample ratio	Rutile (g)	Anatase (g)	Ratio (Rutile:Anatase)	NaCl (g)	(NaPO ₃) ₆ (g)	Na ₃ P ₄ O ₇ (g)	Additive ratios (NaCl: Na(PO ₃) ₆ : Na ₃ P ₄ O ₇)
1	0.4:1.6:8:2:2	0.4	1.6	1:4	8	2	2	4:1:1
2	0.5:1.5:8:2:2	0.5	1.5	1:3	8	2	2	4:1:1
3	0.67:1.34:8:2:2	0.67	1.34	1:2	8	2	2	4:1:1
4	1:1:8:2:2	1	1	1:1	8	2	2	4:1:1
5	0.5:1.5:8:2:2	0.5	1.5	1:3	8	4	0	8:4:0
6	0.5:1.5:8:2:2	0.5	1.5	1:3	8	3	1	8:3:1
7	0.5:1.5:8:2:2	0.5	1.5	1:3	8	2	2	8:2:2 = 4:1:1
8	0.5:1.5:8:2:2	0.5	1.5	1:3	8	1	3	8:1:3
9	0.5:1.5:8:2:2	0.5	1.5	1:3	8	0	4	8:0:4

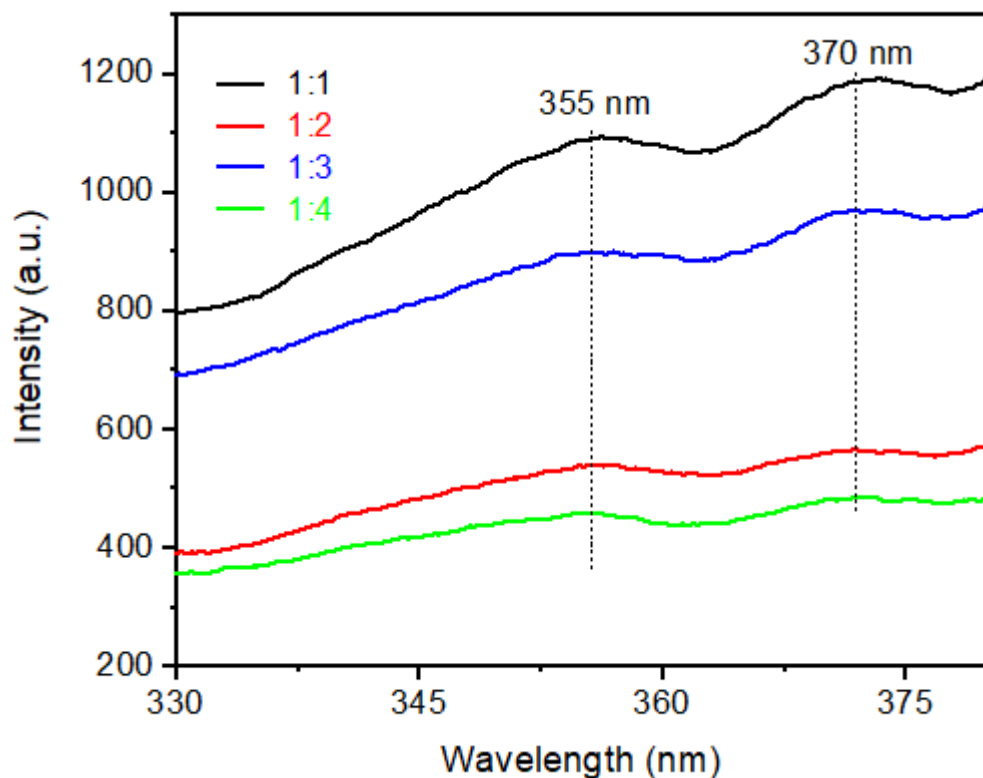


Figure S6. Photoluminescence excitation spectra of synthesized rutile TiO_2 micro-rods with different combination of rutile : anatase precursors such as (black) 1:1, (red) 1:2, (blue) 1:3 and (green) 1:4. for the emission wavelength 825 nm.

Above PL excitation spectra shows two peaks at 355 nm and 370 nm wavelength, however when we measured emission spectrum both those excitation wavelengths show same emission spectrum. Moreover, 355 nm wavelength show little higher intensity peaks compare to 370 nm. Hence, 355 nm wavelength was used as excitation wavelength.

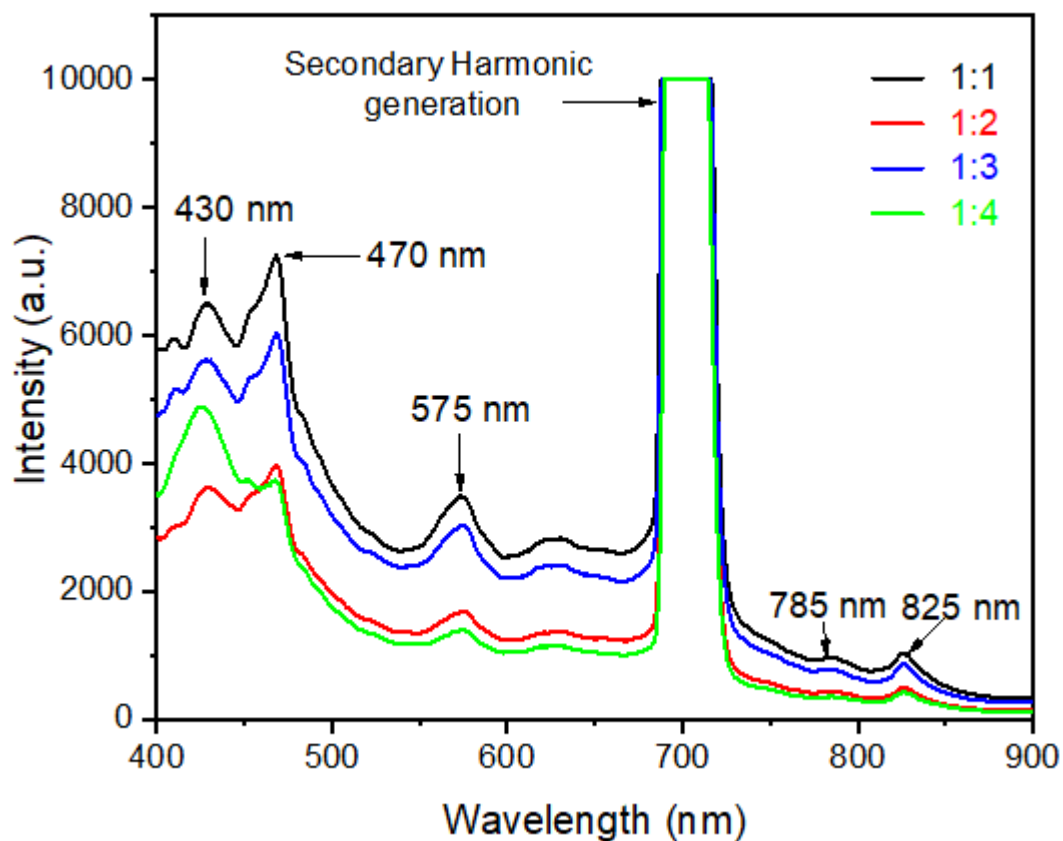


Figure S7. Complete photoluminescence spectra of synthesized rutile TiO₂ micro-rods with different combination of rutile : anatase precursors such as (black) 1:1, (red) 1:2, (blue) 1:3 and (green) 1:4. Secondary harmonic generation peak observed at 710 nm which started from 675 nm and end up at 750 nm. This secondary harmonic peak is exactly twice of excitation wavelength 355 nm.