# Supporting Information

## Metabolic engineering of $TiO_2$ nanoparticles in *Nitzschia palea* to form diatom nanotubes: an ingredient for solar cells to produce electricity and biofuel†

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**TableS1.** Lifetime of sample without presence of any quencher.

| Sample | Lifetime (ns) |
|---|---|
| Diatom | 3.57 |
| Denatured Diatom | 3.72 |

**Supporting Figures:**

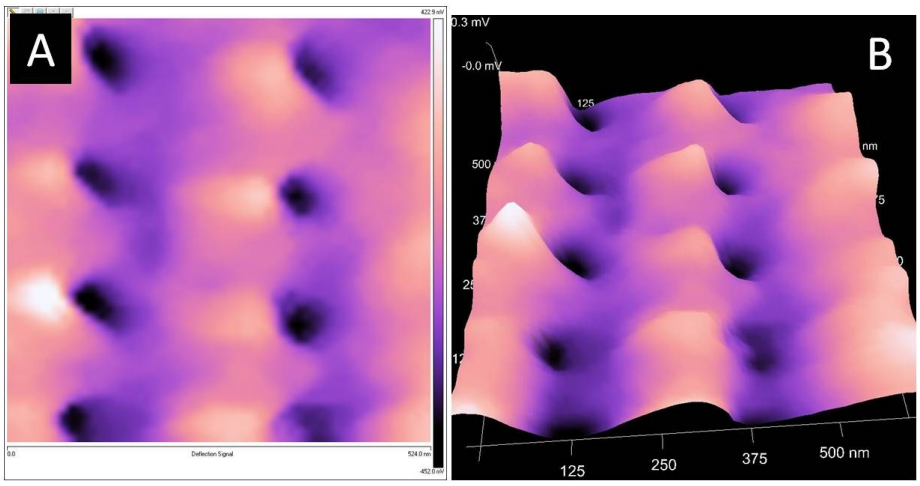



**Figure S1.** High resolution atomic force micrographs of *Nitzschia palea*, (A) control samples showing the surface morphology of diatom without feeding with Ti and (B) corresponding 3-D AFM micrograph.

**SEM IMAGES TAKEN ON DIFFERENT DAYS AFTER FEEDING WITH Ti (0.125 mM to 1.25 mM) AND Si (200 mM)**

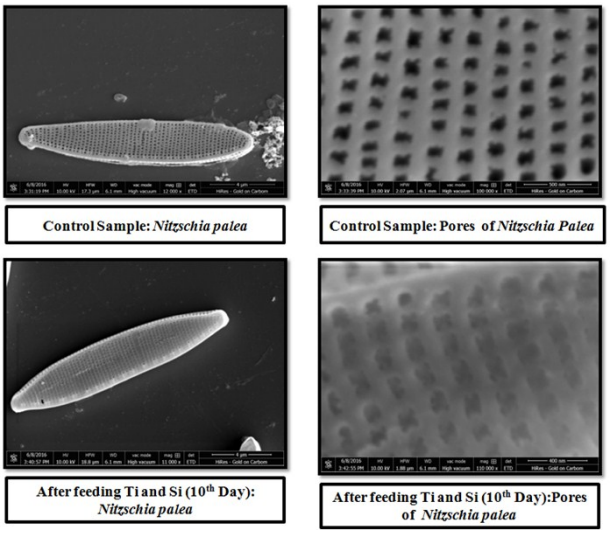



**Figure S2:** Figure depicts that the deposition of Ti on pores of *Nitzschia palea* after feeding with Titanium (0.125mM to 1.25mM (400µL/hr) and Silica (200 mM) (400µL/hr) for 10 hrs.

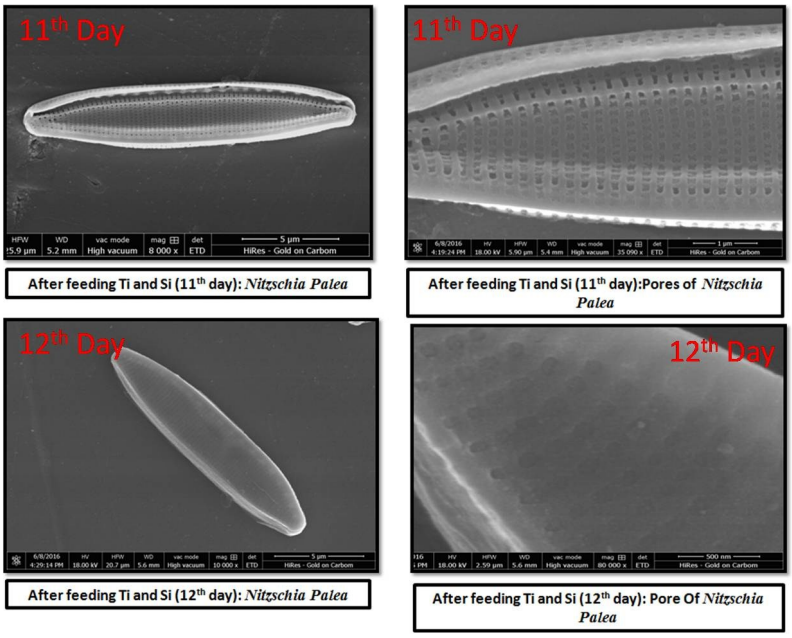



**Figure S3:** The deposition of Ti on pores of *Nitzschia palea* after feeding with Titanium (0.125mM to 1.25mM (400µL/hr) and Silica (200mM) (400µL/hr) for 10 hrs. *Top:* on 11th and *Bottom:* 12th day respectively.

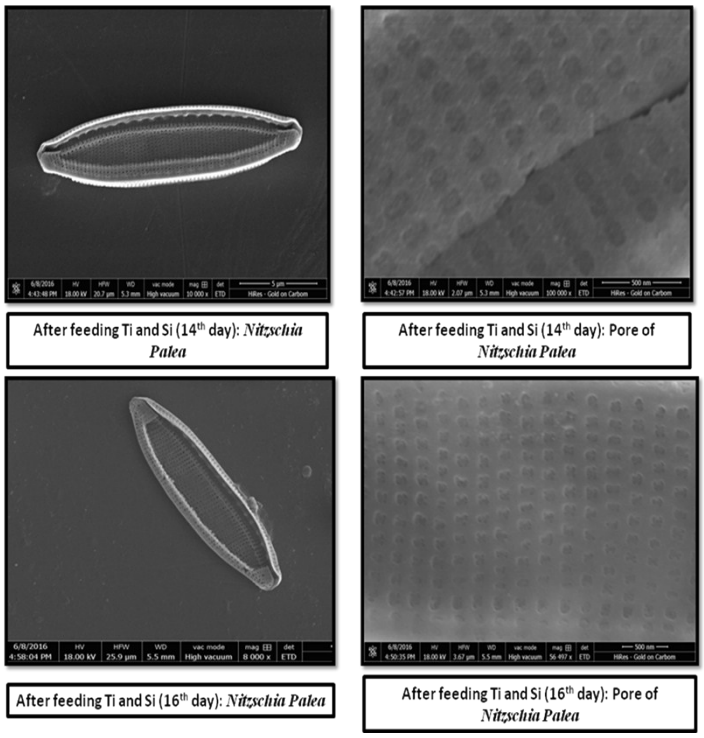



**Figure S4:** Intact and magnified images of Ti treated diatom after the after feeding with Titanium (0.125mM to 1.25mM (400µL/hr) and Silica (200mM) (400µL/hr) for 10 hrs on 14th and 16th day respectively. SEM micrograph clearly showing the deposition of Ti on pores of *Nitzschia palea.*

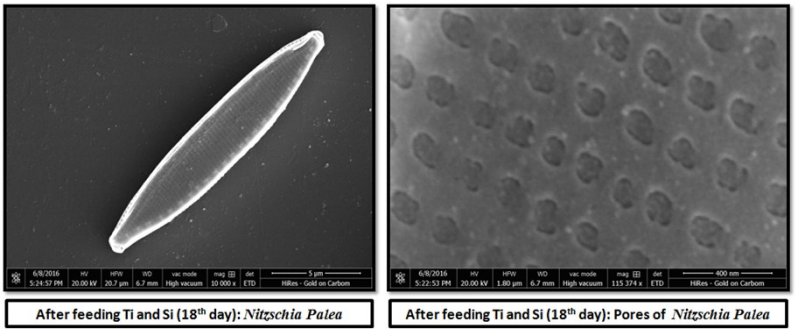



**Figure S5:** SEM micrograph of *Nitzschia palea* diatoms after feeding with Titanium (0.125mM to 1.25mM (400µL/hr) and Silica on 18th day. The micrograph clearly showing the deposition of Ti on pores of and adequate reduction of sizes of pores on 18th day in magnified images(right).

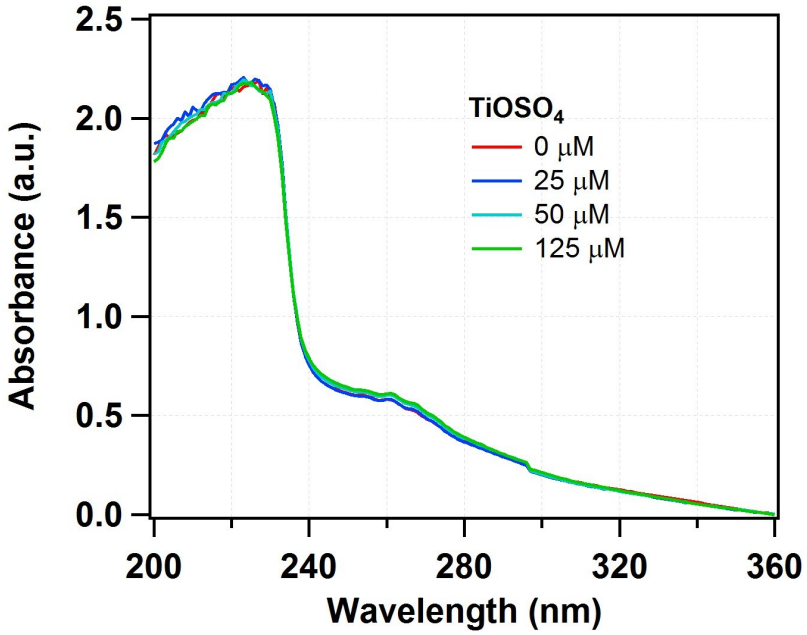
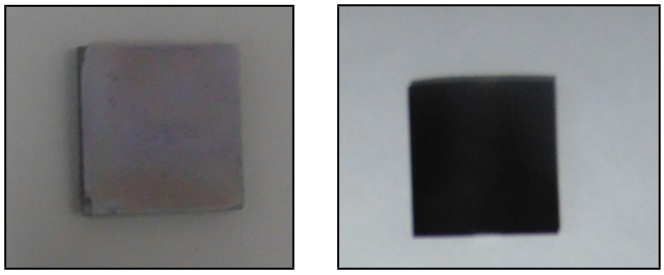



**Figure S6.** Depicts that the UV-Vis spectra of pure diatoms and diatoms in the presence of Ti, which shows the presence of tryptophan/tyrosine residue and complex formation between Ti and diatom.



(I) FTO with $TiO_2$ doped Frustule (II) Carbon soot coated FTO

**Figure S7.** Depicts the electrodes constructed for DSSC; (I) shows FTO electrode with $TiO_2$ doped diatom frustules and (II) shows carbon soot coated on FTO plate.