## **Supplementary Information**

## Multifunctional tannic acid-Fe<sup>3+</sup>-graphene oxide loaded alginate photothermal network: interfacial water evaporator, disinfector and power generator

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S.No	PT Material	GO wt% (g)	TA wt% (g)	FeCl <sub>3</sub> (g)
1.	GO	0.5	-	-
2.	GO-Fe <sup>3+</sup>	0.5	-	0.1
3.	GO-TA/Fe <sup>3+</sup>	0.5	0.1	0.05
4.	PT-1	0.5	0.1	0.1
5.	PT-2	0.5	01	0.2
6.	PT-3	0.5	0.1	0.3
7.	PT-4	0.5	0.1	0.4
8.	PT-5	0.5	0.1	0.5
9.	PT-6	0.5	0.1	0.2
10.	PT-7	0.5	0.2	0.2
11.	PT-8	0.5	0.3	0.2
12.	РТ-9	0.5	0.4	0.2
13.	PT-10	0.5	0.5	0.2

## Table S1: Material preparation and loading parameters

S.No	Material	Refractive Index (n)
1.	GO	1.8
2.	GO-Fe <sup>3+</sup>	1.6
3.	GO-TA/Fe <sup>3+</sup>	1.8
4.	PT-1	1.6
5.	PT-2	1.8
6.	PT-3	1.7
7.	PT-4	1.7
8.	PT-5	1.8
9.	PT-6	1.8
10.	PT-7	1.7
11.	PT-8	1.6
12.	PT-9	1.7
13.	PT-10	1.7

 Table S2. Refractive index of the prepared materials

Table S3.  $I_D\!/$   $I_G$  and  $sp^2$  crystallite values from the Raman spectrum

S.No	Material	I <sub>D</sub> /I <sub>G</sub>	sp <sup>2</sup>
			crystallite
			(L) nm
1.	GO	0.95	13.2
2.	GO-Fe <sup>3+</sup>	1.19	16.6
3.	GO-TA/Fe <sup>3+</sup>	0.94	13.1
4.	PT-1	0.98	13.6
5.	PT-2	0.93	12.9
6.	PT-3	0.93	12.9
7.	PT-4	0.98	13.6
8.	PT-5	0.97	13.5
9.	PT-6	1.32	18.4
10.	PT-7	1.31	18.2
11.	PT-8	1.31	18.2
12.	PT-9	1.33	18.5
13.	PT-10	1.31	18.2





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Element	Wt%	Wt% Sigma
С	54.21	1.64
0	39.64	1.66
Fe	6.15	0.32
Total:	100.00	



Fig. S2: Zeta potential of GO, GO-Fe<sup>3+</sup>, GO-TA and TA- Fe<sup>3+</sup>-GO-ALG (PT-2)

Fig. S3: DLS size distribution of GO and TA- Fe<sup>3+</sup>-GO-ALG (PT-2)



Fig. S4(a): XRD patterns of TA- Fe<sup>3+</sup>-GO-ALG (PT-2) before and after 1 Sun illumination



Fig. S4(b): SEM images of TA- Fe<sup>3+</sup>-GO-ALG (PT-2) before and after 1 Sun illumination

