Supporting Information

InP/ZnS Quantum Dots for High Sensitivity Temperature Sensors

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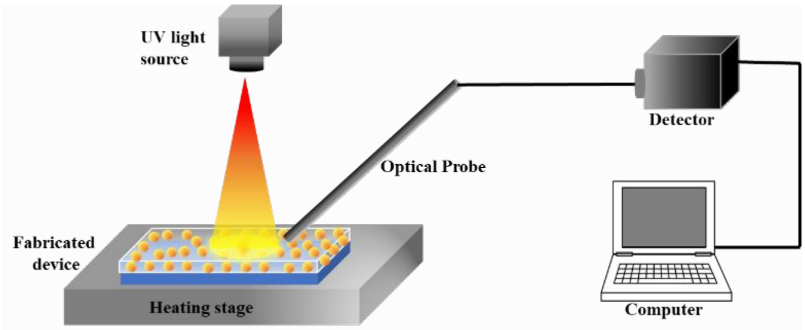
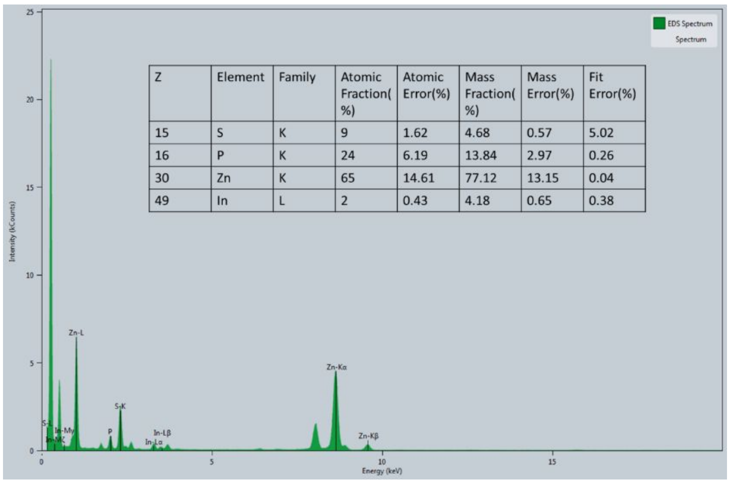


Figure S1. Experimental set up for cyclic heating cooling measurement.



Z	Element	Family	Atomic Fraction(%)	Atomic Error(%)	Mass Fraction(%)	Mass Error(%)	Fit Error(%)
15	S	K	9	1.62	4.68	0.57	5.02
16	P	K	24	6.19	13.84	2.97	0.26
30	Zn	K	65	14.61	77.12	13.15	0.04
49	In	L	2	0.43	4.18	0.65	0.38

Figure S2. EDX analysis data of the InP/ZnS QDs

S(A). PLQY calculation

The formula used for PLQY(ɵ) calculation is given below.

$$ɵ = \frac{Ec - (1 - A).Eb}{La.A} = \frac{Ec - Ea}{La - Lc}$$

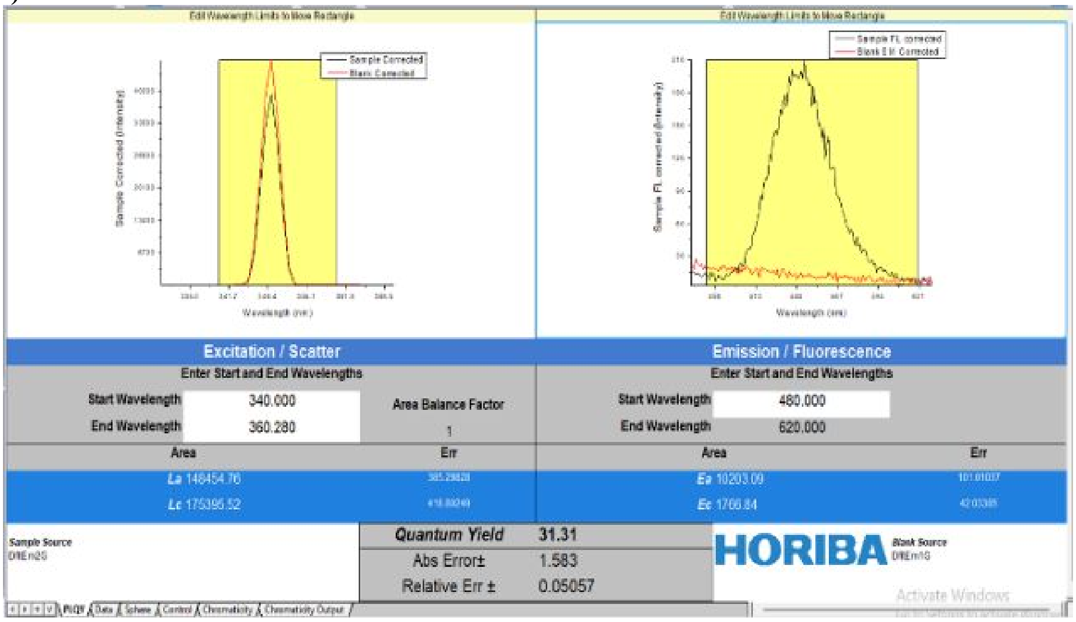
where, A measurement is done of the fluorescence emission (E_c) and the scatter (L_c) of the sample and also the emission and scatter of a blank (L_a and E_a). Where E_b is the integrated luminescence from the sample caused by indirect luminescence from the sphere and A is the absorbance of the sample at the excitation wavelength.

Our datas are attached below

PLQY(ɵ) for InP/ZnS QDs dispersed in chloroform $=\frac{1766.84-10203.09}{148454.76-175395.52}$=31.31%

PLQY for InP/ZnS and PMMA composite $=\frac{156855.45-382872.32}{3191.2521-3273.95998}$ =42.27%

(a)



(b)

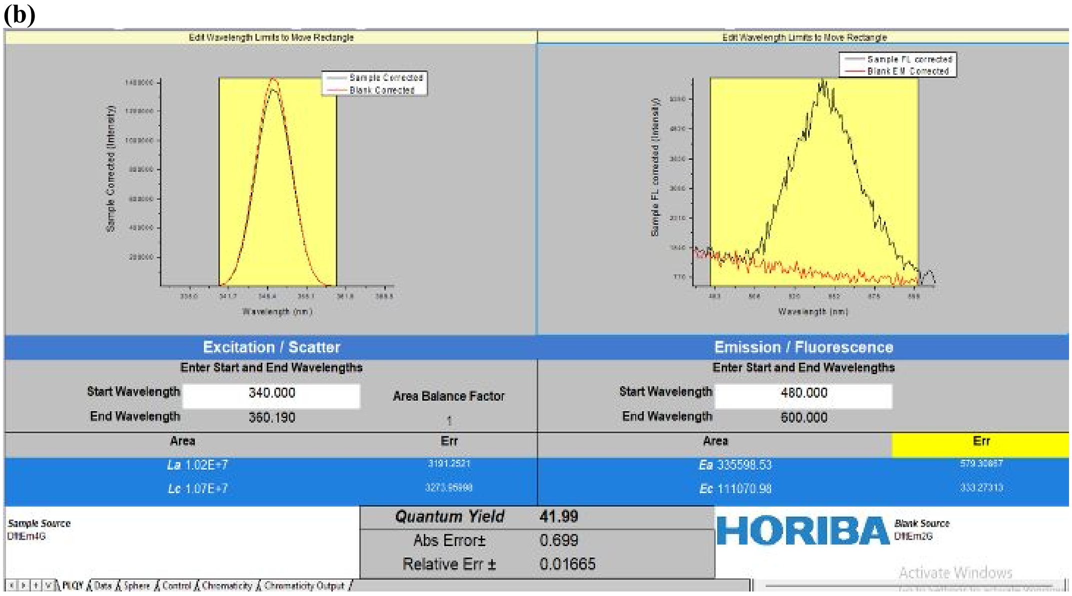


Figure S3: (a) PLQY measurement for InP/ZnS QDs dispersed in liquid (chloroform) (b) PLQY measurement of InP/ZnS QDs- PMMA composite

Table S1. Parameter to fit decay lifetime curve

Temperature	25°C	65°C	85°C
τ_1	3.31	3.13	2.82
τ_2	30	26.2	19.1
τ_3	0.54	0.49	0.45
A_0	350.59	292.3842	229.29
A_1	0.02145	0.02149	0.02759
A_2	0.01053	0.01081	0.01202
A_3	0.02328	0.02395	0.0299
χ^2	0.99	1.03	1.01

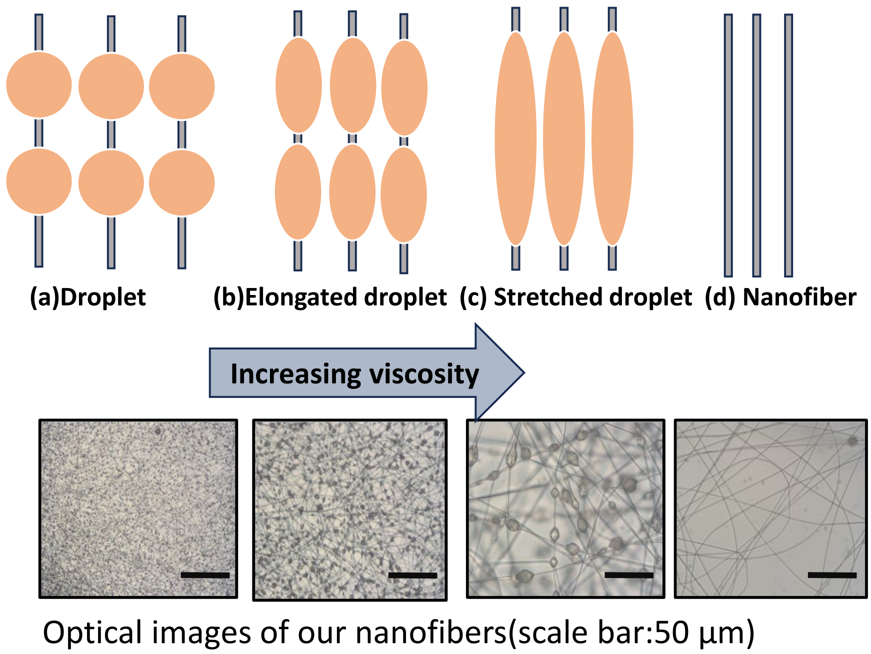


Figure S4. Schematic and optical images of formation mechanism of nanofibers. On increasing the viscosity of the PMMA QD composite morphology transition of the nanofibers has been observed.

S.(B). QD doped electrospun nano/micro fiber fabrication:

For electrospinning, a homogenous 10 wt% PMMA polymer-chloroform solution was prepared and InP/ZnS QDs were added followed by homogeneous mixing of the solution by stirring (1hr) and sonication few times. A capillary tip with an inner diameter of 0.41 mm was attached to a 5 mL plastic syringe containing the polymer composite solution. A direct power supply (SIMCO) was used to supply a voltage of 12 kV. Throughout the process, the working distance of 9 cm was maintained between the nozzle and the collector. The electrospun fibres were collected on cleaned silicon wafers that were attached to a grounded aluminium foil using copper tape.

Figure S5. Electrospinning set up and nanofiber deposition on Si wafer and Al foil (up right), deposited fibers on Al foil and Si wafer under UV light and day light (below right).

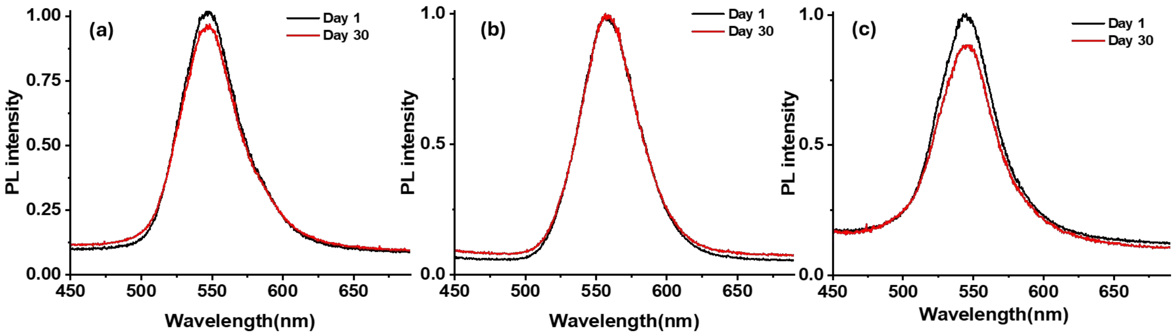


Figure S6. PL spectra taken on day 1 and day 30 for the three sensors (a) sensor 1-planar configuration temperature sensor (b) sensor 2 – QD-PMMA filled borosilicate fiber temperature sensor (c) sensor 3 -QD-PMMA doped electrospun nano fiber temperature Sensor.