Supporting Information

Ag_2S-Glutathione Quantum Dots for NIR Image Guided Photothermal Therapy

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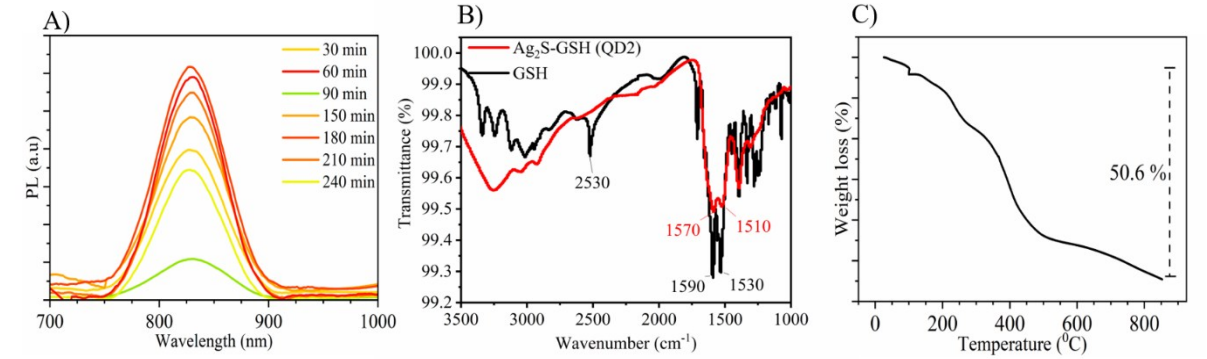

Fig. S1 Absorbance calibrated photoluminescence spectra of (A) QD5 synthesized with TAA at 50 ℃ at different time, (B) FTIR spectrum of QD2 and glutathione and (C) Thermogravimetric analysis (TGA) of QD2.

Table S1 *Time dependent changes in the particle properties*[*]

Time	$\lambda_{abs(max)}$[a] (nm)	Size[b] (nm)	$\lambda_{em(max)}$ (nm)	Dh-number[c] (nm)	Dh-intensity[d] (nm)
1st day	923	3.01	891	6.7	3.8 ± 0.1
1st month	923	3.01	891	12.8	4.1 ± 0.2
9th month	946	3.09	891	30.2	4.0 ± 0.1
1 year	946	3.09	897	48.9	4.6 ± 0.4

[*] QD2 was used for this experiment. [a] Absorbance onset. [b] Crystal diameter calculated using the Brus equation. [c] Hydrodynamic diameter measured by DLS and reported as the number average. [d] Hydrodynamic diameter measured by DLS and reported as the intensity average.

Photothermal efficiency calculation:

The photothermal efficiency was calculated by using following formula

$$\eta = \frac{ha(T_{max} - T_{amb}) - Q_{dis}}{P(1 - 10^{-A_{795nm}})} \qquad (Eq.\ S1)$$

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where h is the heat transfer coefficient, a is the irradiated area, T_{max} is the equilibrium temperature, T_{amb} is the ambient temperature, and Q_{dis} is the heat dissipated due to light absorption in the polystyrene cell. P and A_{795nm} appearing in the denominator represent the laser power and absorbance of the Ag_2S-GSH QDs, respectively, at 795 nm.

ha can be calculated by using the following formulas:

$$ha = \frac{\sum m_i C_{p,i}}{\tau_s}$$

$$t = -\tau_s In\theta$$

$$\theta = \frac{T - T_{amb}}{T_{max} - T_{amb}}$$

Above, m, C_p, t, τ_s are the mass of sample, the thermal capacity, cooling time after irradiation, and the sample system time constant, respectively. The quantity Q_{dis} was determined by using the following formula which accounts for the absorption of the laser power within water and the polystyrene cuvette:

$$Q_{dis} = ha(T_{max,water} - T_{amb,\,water})$$

The values of T_{max}, T_{amb}, τ_s, $m_{cuvette}$, m_{sample}, $C_{cuvette}$, C_{water} were 45 °C, 25 °C, 220.8 sec, 1.9110 g, 0.7513 g, 1.4 J/g C and 4.186 1.4 J/g C, respectively. Therefore, ha was calculated as 26.4 mW/C. Q_{dis} was determined to be 0 because there was no significant temperature change in the water at these pump power levels. By substituting these parameters into Equation S1, the PTT efficiency was determined to be 80%.