Electronic Supplementary Information

Hollow Carbon Nanospheres Derived from Biomass By-product Okara for Imaging-guided Photothermal Therapy of Cancers

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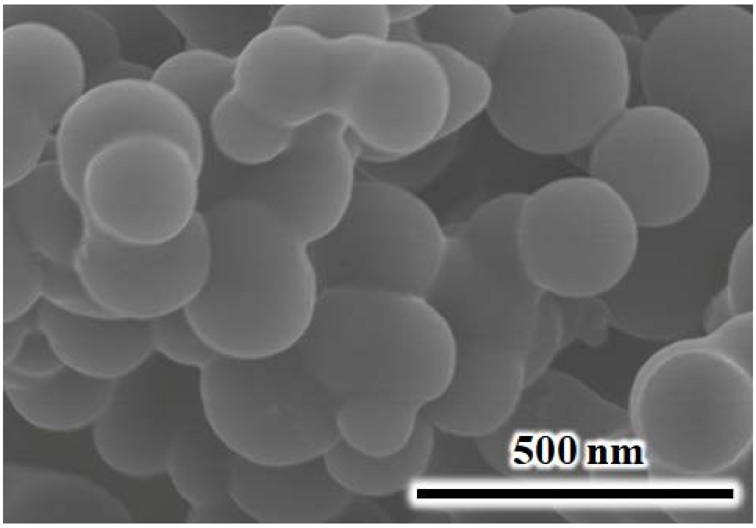

Figure S1. SEM image of HCNS.

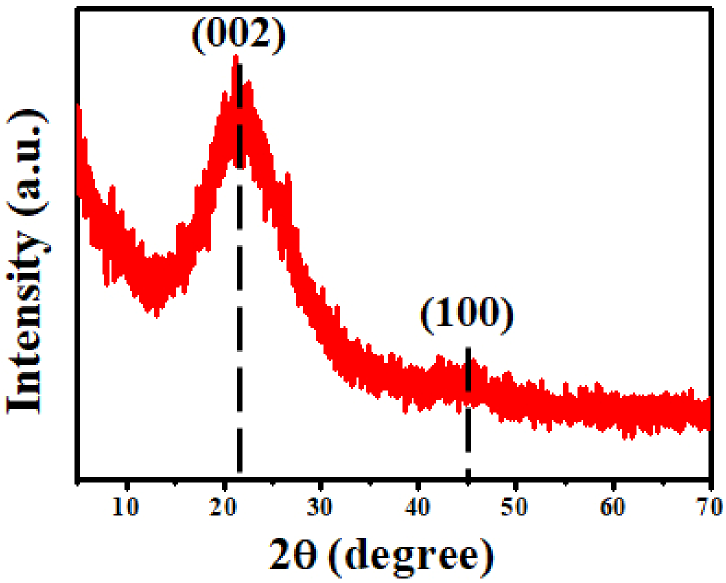

Figure S2. XRD pattern of HCNS.

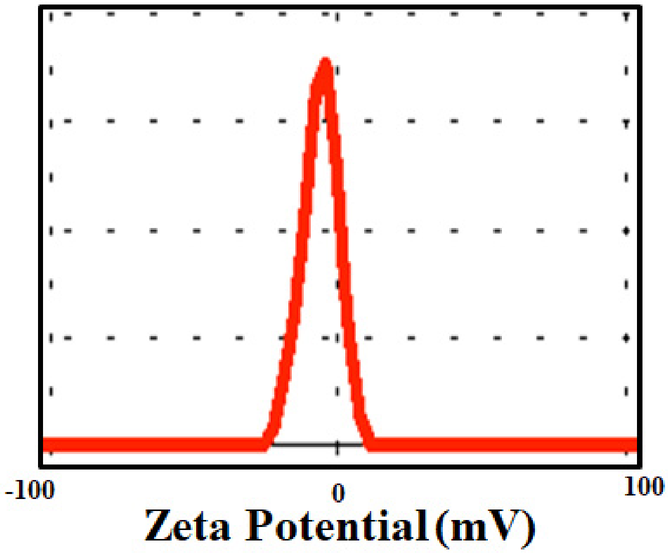

Figure S3. Zeta potential of HCNS.

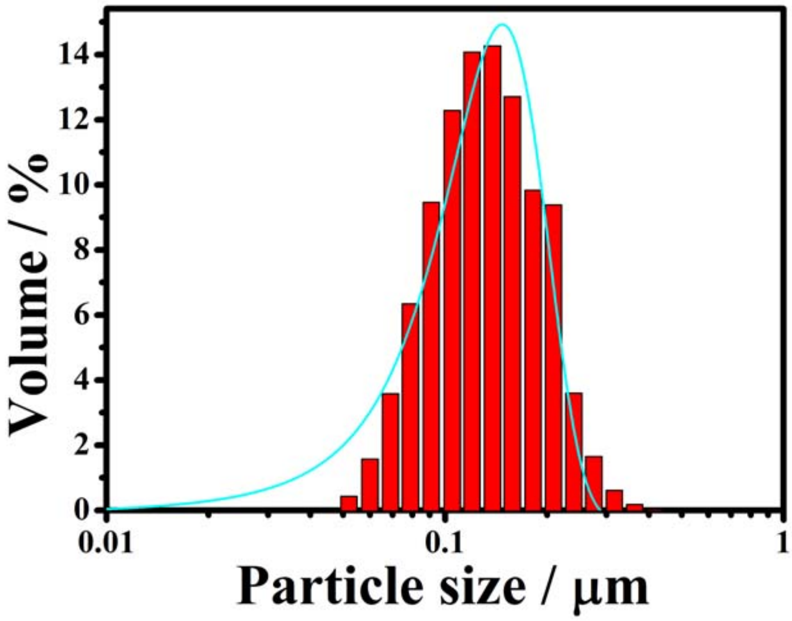

Figure S4. DLS measurement of HCNS.

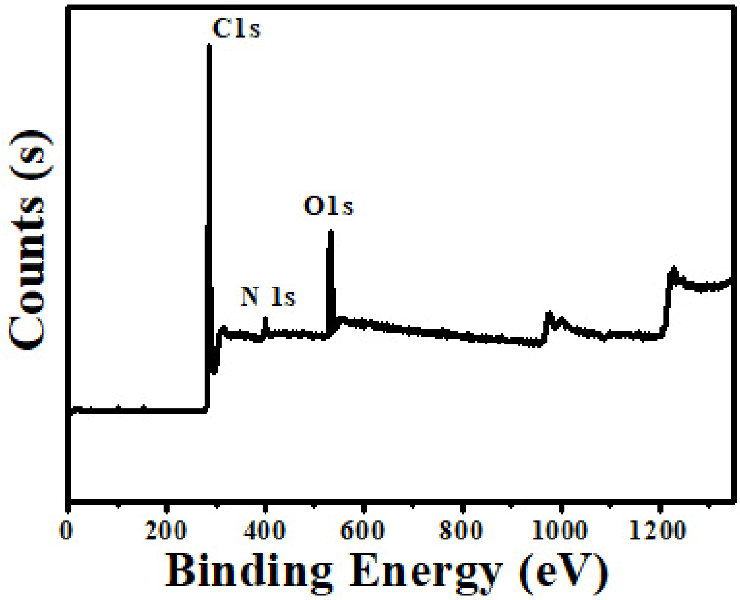

Figure S5. X-ray photoelectron survey spectra (XPS) spectrum of the HCNS.

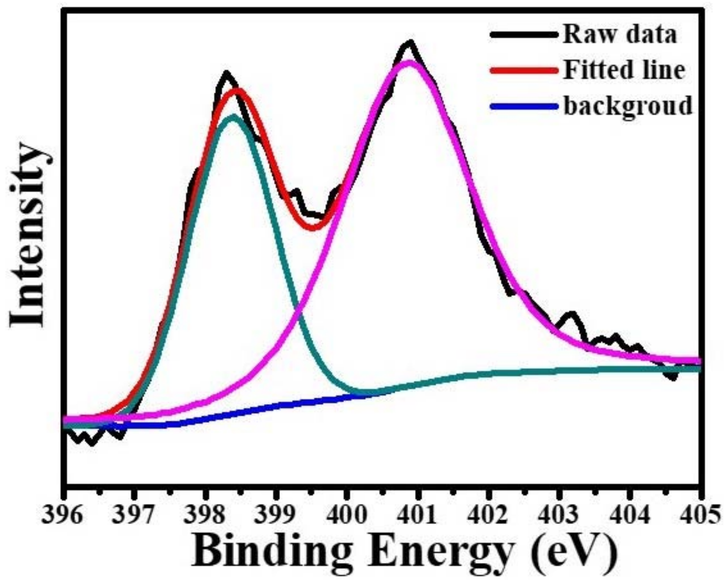

Figure S6. N 1s XPS spectra of HCNS.

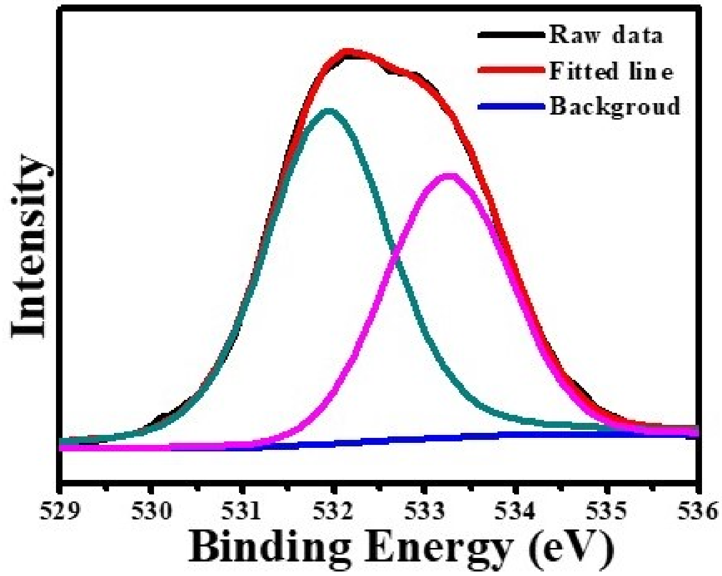

Figure S7. O 1s XPS spectra of HCNS.

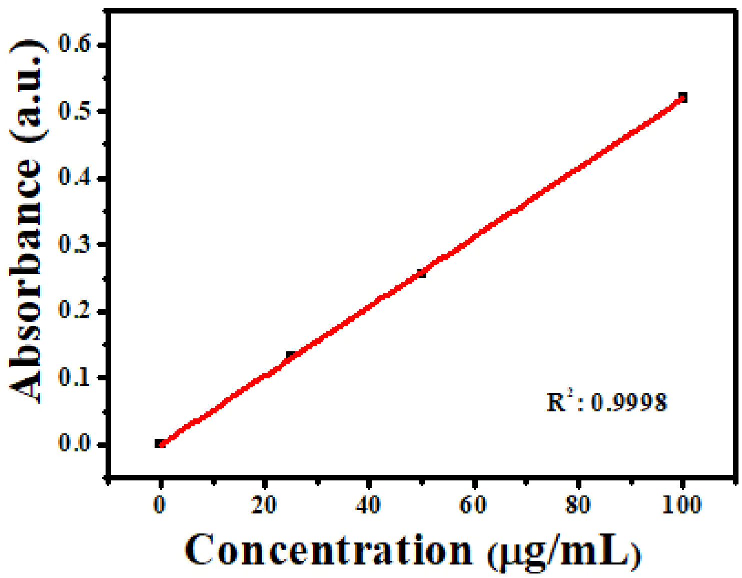

Figure S8. The fitting curve of the absorbance of HCNSs aqueous dispersions at 808 nm as a function of HCNSs concentrations; the correlation coefficient (R^2) is 0.9998.

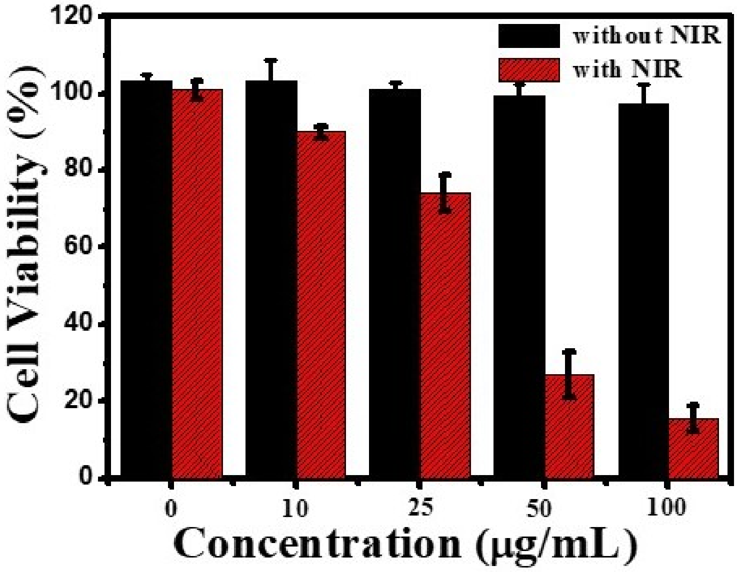

Figure S9. Cell viability of HepG-2 cells treated with HCNS with and without NIR irradiation (808 nm, 1.5 W, 10 min).

Table S1 Photothermal conversion efficacy of several PTT agents.

	Agents	Wavelength (nm)	η	Ref.
1	UiO-66@PAN	808	21.6	1
2	SPN_{CT}	808	35	2
3	AuNR	808	15.7	3
4	AuNR	808	61	4
5	C-dots	635	38.5	5
6	$Cu_{2-x}Se$	800	22	6
7	ILAA NHCs	808	32.89	7
8	DTC cocrystal	808	18.8	8
9	$WO_{2.9}$ Nanorods	808	44.9	9
10	Au-Ag nanourchins	808	80.4	10
11	Graphene	808	67	11
12	Graphene oxide	808	58	11
13	HCNS	808	35.7	This work

Photothermal Conversion Efficiency Measurement

To precise evaluate the photothermal conversion efficiency (η) of HCNS, which was calculated according to a literature method[12]:

$$\eta = \frac{hS\left(T_{max,HCNS} - T_{max,solvent}\right) - Q_O}{I(1 - 10^{-A_{808}})}$$

Where $T_{max,HCNS}$ and $T_{max,solvent}$ are maximum temperature for HCNS solution and water with irradiation. *h* is the transfer coefficient. *S* represents the surface area of the cuvette cell. Q_0 is the heat input due to light absorption by the solvent. *I* is the irradiation laser power (1.5 W). A_{808} is the absorbance at 808 nm. For the calculation of *hS* following equation was used:

$$\mathrm{hS} = \frac{\sum c_i m_i}{\tau_s}$$

Where m_i and c_i represent the mass and heat capacity of each element of the system, respectively (solvent (1.5 g, 4.2 J/(g×°C)), heating material (0.15 mg, 1.6 J/(g×°C)).[11] The heat capacity of HCNS was measured by the differential scanning calorimeter (PerkinElmer DSC8500). The sample system time constant (τ_s) was calculated using the equation:

$$\tau_s = -\frac{t}{ln\theta}$$

Where *t* is time and θ is the dimensionless driving force.

References

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