Electronic Supplementary Information

Facile Synthesis of Monodisperse Chromogenic Amylose-Iodine Nanoparticles as an Efficient Broad-Spectrum Antibacterial Agent

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Calculation of the photothermal conversion efficiency

To calculate the photothermal conversion efficiency of AM-I NPs, 1 mL of AM-I NPs aqueous solution (90 µg/mL) was continuously irradiated under the same condition until reaching a steady-state temperature. The laser was then shut off and the temperature decrease process was also recorded. the photothermal conversion efficiency (η) was calculated using equation (1) described by Roper[1]:

$$\eta = \frac{hS(T_{max} - T_{surr}) - Q_s}{I(1 - 10^{-A_{808}})} \qquad (1)$$

where h is the heat transfer coefficient, S is the surface area of the container, T_{max} is the maximum system temperature, T_{surr} is the ambient surrounding temperature, Q_s is the heat associated with the light absorbance of the solvent, I is the laser power (2 w) and A_{808} is the absorbance of AM-I NPs at 808 nm. The value of hS is derived according to equation (2):

$$\tau_s = \frac{m_D C_D}{hs} \qquad (2)$$

where τ_s is the sample system time constant, m_D and C_D are the mass (1 g) and heat capacity (4.2 J/ (g.^{o}C)) of deionized water, respectively. Q_s is measured independently to be 12.6 mW using pure water. In order to get the value of hS, we further introduce ϑ, which is defined as follows:

$$\theta = \frac{T - T_{surr}}{T_{max} - T_{surr}} \tag{3}$$

where T is the solution temperature. Thus, hS can be determined by applying the linear time data from the cooling period *vs–ln*ϑ.

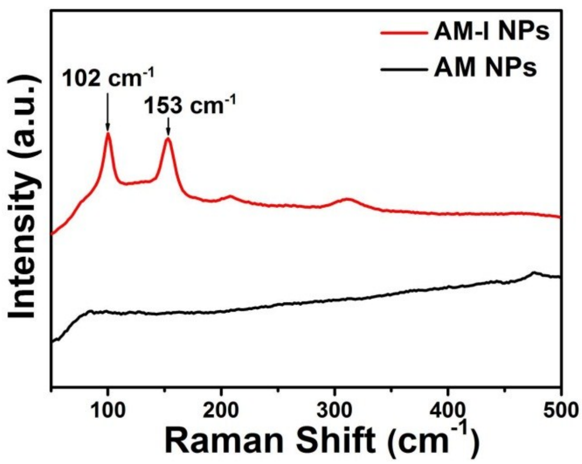

Fig. S1 Raman spectra of AM NPs and AM-I NPs.

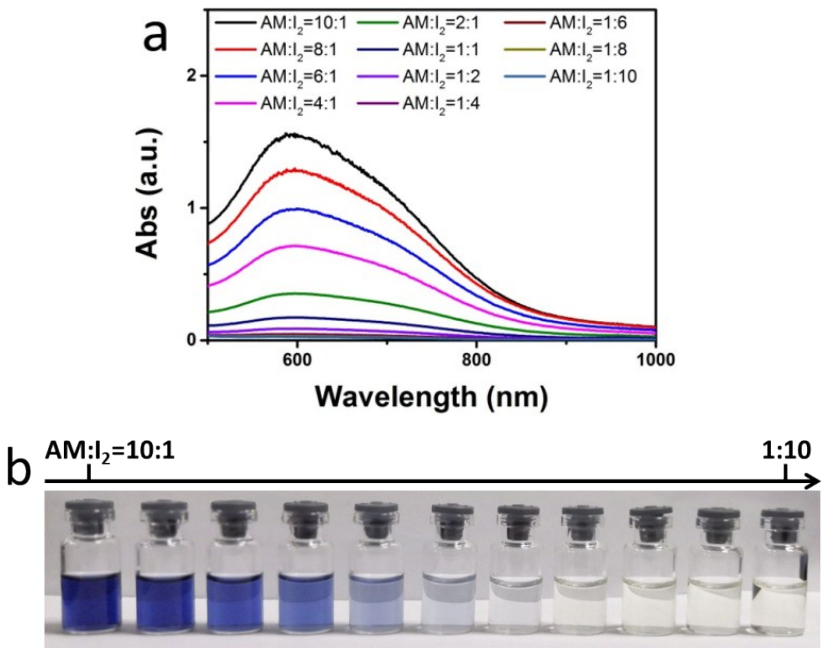

Fig. S2 a) The UV-vis-NIR absorption spectrum and b) digital photograph of different mass ratio between AM NPs and KI-I_2.

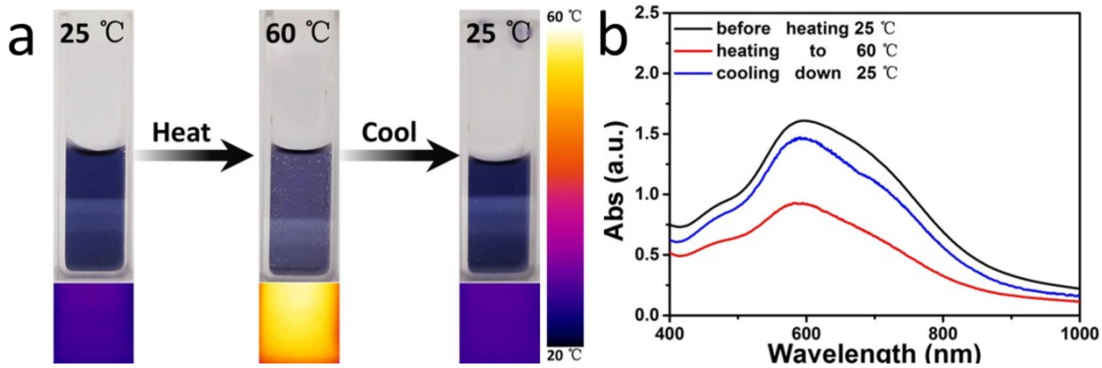

Fig. S3 The change of AM-I NPs before heating, holding temperature and cooling down. a) Digital photograph and thermal image; b) UV-vis-NIR spectra.

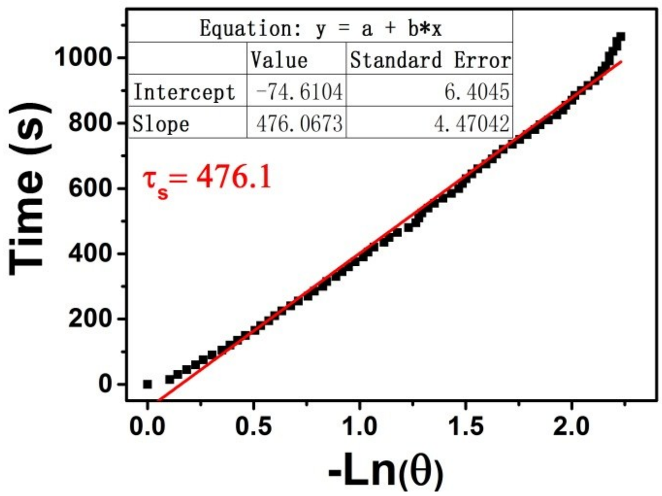

Fig. S4 Calculation of the photothermal conversion efficiency according the data of time and negative natural logarithm of the temperature.

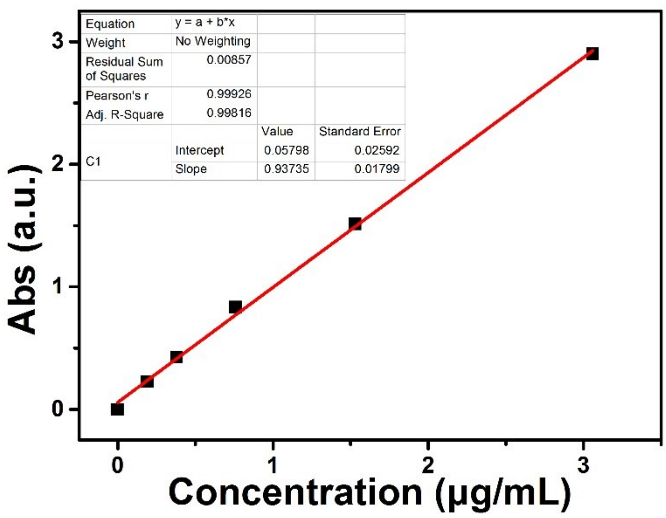

Fig. S5 The standard curve of KI-I_2 solution (λ=225 nm).

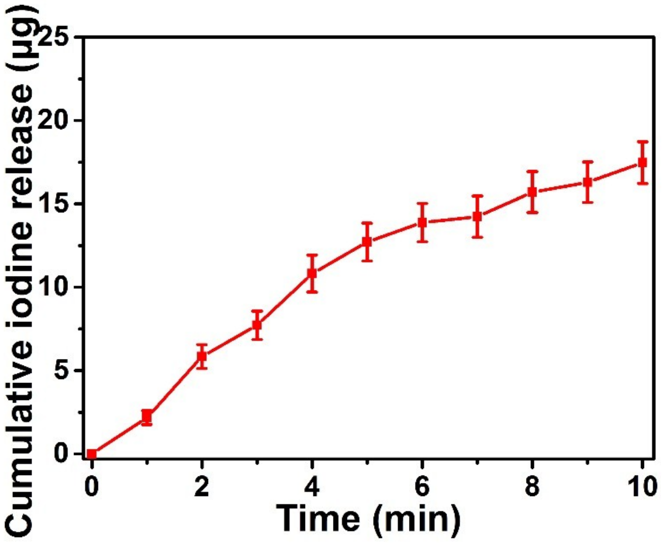

Fig. S6 The cumulative release amount of iodine from AM-I NPs at different times.

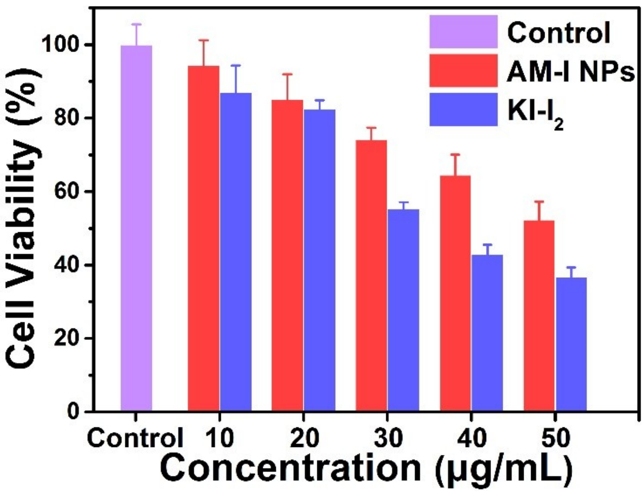

Fig. S7 Cell biocompatibility of AM-I NPs and KI-I_2 in gradient concentration for 24 h.