

ADVANCED FUNCTIONAL MATERIALS

Supporting Information

for *Adv. Funct. Mater.*, DOI: 10.1002/adfm.201501524

**Biocompatible PEG-Chitosan@Carbon Dots Hybrid Nanogels
for Two-Photon Fluorescence Imaging, Near-Infrared Light/
pH Dual-Responsive Drug Carrier, and Synergistic Therapy**

*Hui Wang, Jing Di, Yubing Sun, Jianping Fu, Zengyan Wei,
Hiroshi Matsui, Alejandra del C. Alonso, and Shuiqin Zhou**

Supporting Information

Biocompatible PEG-chitosan@carbon dots hybrid nanogels for two-photon fluorescence imaging, near-infrared light/pH dual-responsive drug carrier and synergistic therapy

Hui Wang, Jing Di, Yubing Sun, Jianping Fu, Zengyan Wei, Hiroshi Matsui, Alejandra del C. Alonso and Shuiqin Zhou*

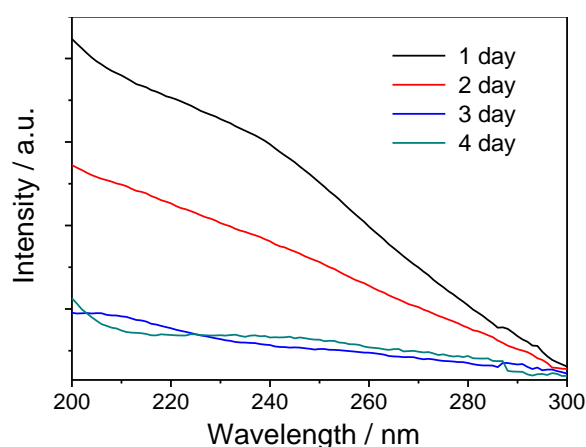


Figure S1. Typical UV-visible absorption spectra of the external solution outside of the dialysis tube containing the synthesized PEG-chitosan@CDs (CD representing for carbon dot) hybrid nanogel solutions, after the dialysis of the hybrid nanogels against frequently changed water for different time length. The results indicate that the free CDs with a characteristic absorption peak at about 240 nm can be removed from the hybrid nanogel dispersions after continuous dialysis for about 3-4 days.

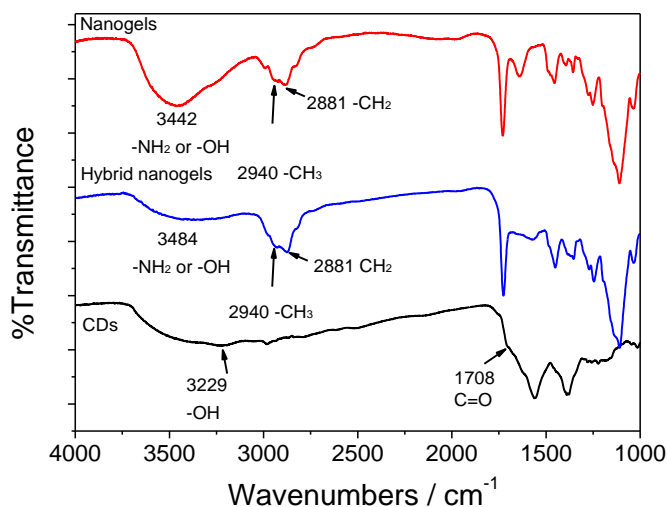


Figure S2. FT-IR spectra of the CDs, PEG-chitosan nanogels and PEG-chitosan@CDs hybrid nanogels.

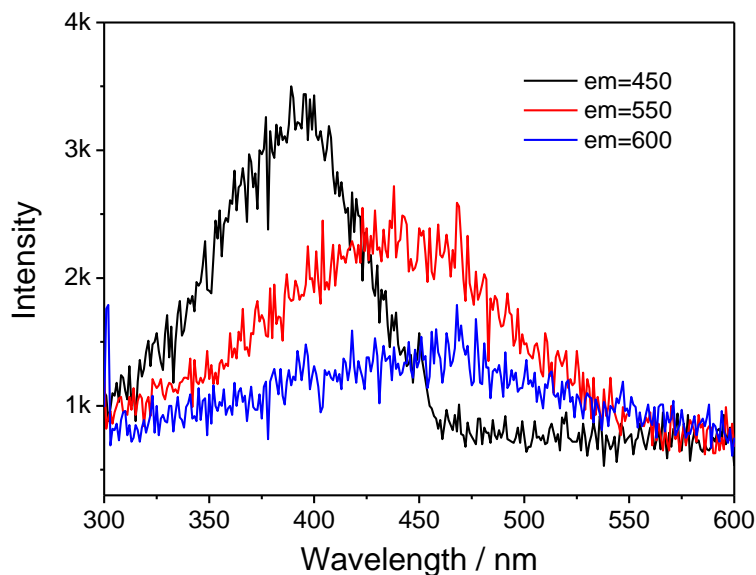


Figure S3. Typical excitation spectra of the PEG-chitosan@CDs hybrid nanogels with different emission wavelength.

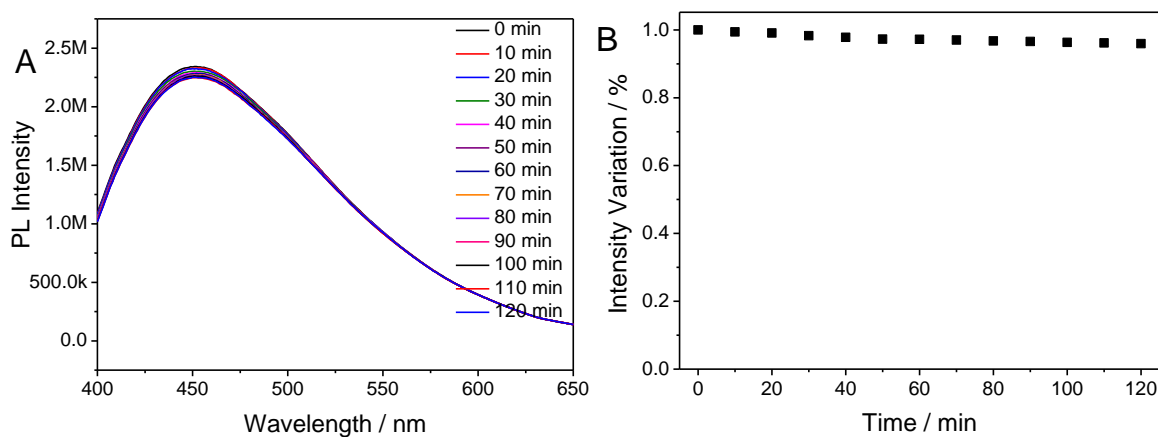


Figure S4. (A) PL spectra with maximum $\lambda_{em} = 450$ nm and (B) PL intensity variation of the PEG-chitosan@CDs hybrid nanogels under different excitation time from 0 min to 120 minutes. Excitation wavelength = 360 nm.

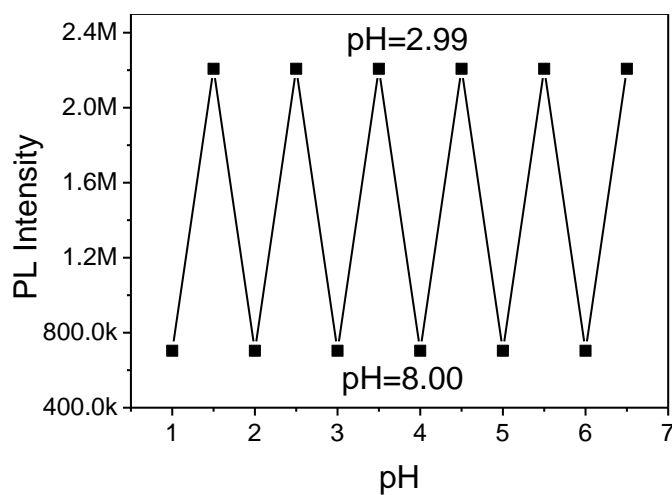


Figure S5. The maximum PL intensity (excitation wavelength of 360 nm) measured during the repeated centrifugation and pH adjustment cycles of the PEG-chitosan@CDs hybrid nanogels between pH = 2.99 and pH = 8.00.

Figure S6. Three dimensional cell imaging video of DU145 human prostate cancer cells incubated with the PEG-chitosan@CDs hybrid nanogels (5 $\mu\text{g}/\text{mL}$) under an excitation wavelength of 405.

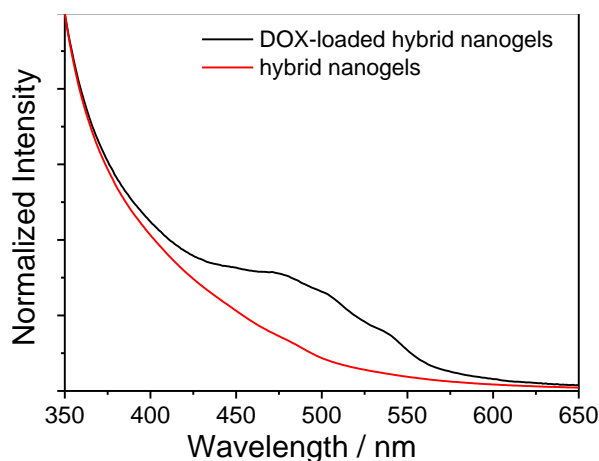


Figure S7. A comparison of typical UV-visible absorption spectra of the PEG-chitosan@CDs hybrid nanogels and DOX-loaded PEG-chitosan@CDs hybrid nanogels.

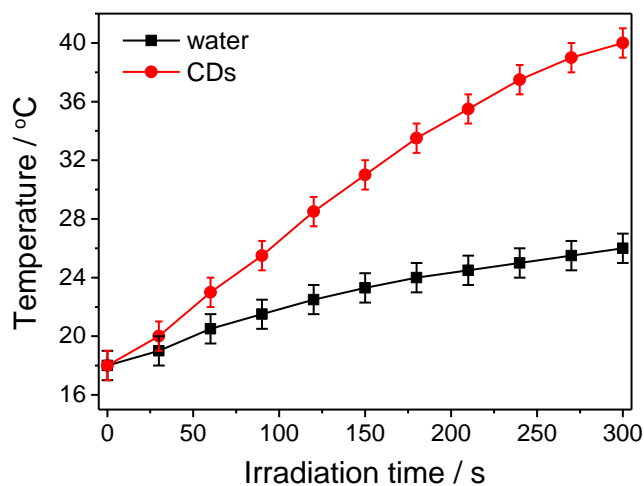


Figure S8. The heating curves of water and the dispersion of CDs in water (50 mg/L) under a NIR irradiation of $1.5 \text{ W}/\text{cm}^2$.