Supporting Information

Photothermal-enhanced antibacterial and antioxidant hydrogels dressings based on catechol-modified chitosan derived carbonized polymer dots for effective treatment of wound infection

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Materials characterization

Fourier transformed infrared (FTIR) spectra of DFC, CPDs and hydrogels were recorded by FTIR spectrometer Nicolet iS10 (Thermo Fisher Scientific, USA) by collecting 32 accumulative scans in 400 to 4000 cm^{-1} regions. The fluorescence (FL) spectroscopy of CPDs was performed with an F-2700 fluorescence spectrophotometer (Hitachi, Japan) and the emission spectra were recorded in the wavelength range of 300-420 nm. Ultraviolet-Visible spectrum was scanned by Thermo Scientific Evolution 220 spectrophotometer. The nuclear magnetic resonance (^1H NMR) spectrum of DFC was obtained by NMR spectrometer (AVANCEIII 500 MHz, Bruker, Germany). High-resolution transmission electron microscopy (HRTEM) of CPDs images was received by JEM 2100f at 200 kV (JEOL Ltd, Japan). The surface morphology of the PVA nanocomposite hydrogels was investigated after lyophilizing and spraying gold using a scanning electron microscope (SEM) (Quanta 250FEG, FEI, USA). The X-ray diffraction (XRD) method was used to measure the crystallinity of the hydrogels (D8 ADVANCE, Bruker, Germany). The Zeta potential (ζ) of CPDs in the PBS solution at pH=7.4 and pH=5.5 was performed by a Zetasizer (Nano ZS, Malvern Instruments, Worcestershire, UK).

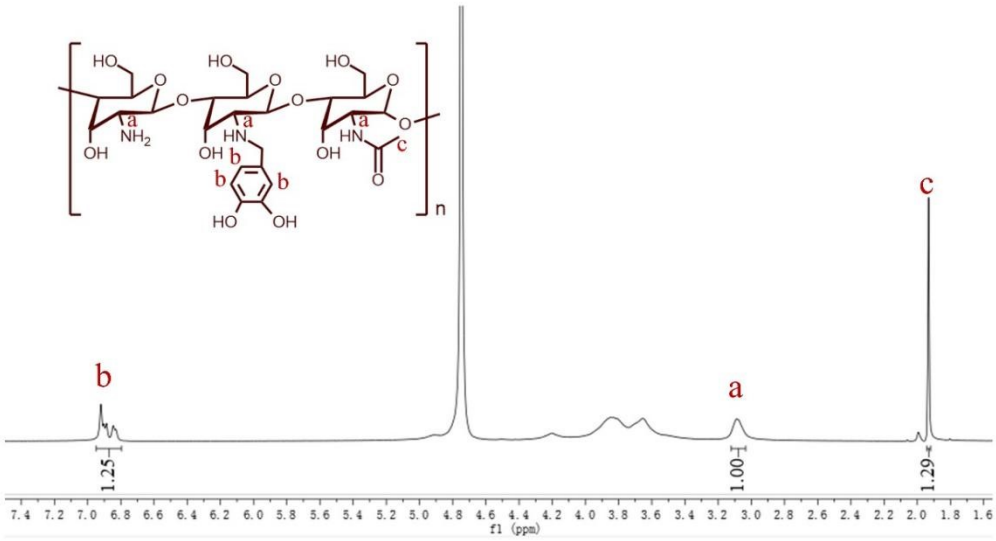

Fig. S1 ^{1}H NMR spectra of DFC

Peaks marked by ‘a’ represent the C2 protons in the derivatized and underivatized glucosamine ring. The aromatic protons of the catechol units between 6.7-7.0 ppm were marked with ‘b’. The acetyl group in chitosan marked by ‘c’.

Degree of substitution (DS) of catechol units in DFC was determined by comparing the signal intensity of b with that of a.

The result showed that DFC was successfully prepared by reductive amination and the calculated DS was about 41.7%.

Table. S1 MIC of CPDs and DFC

Samples	MIC (μg/mL)			
	S.aureus		*E.coli*	
	7.4	5.5	7.4	5.5
CPDs-160	500	62.5	1000	250
CPDs -170	250	62.5	1000	250
CPDs -180	125	31.25	500	125
CPDs -190	125	62.5	500	125
CPDs -200	250	125	500	250
DFC	1000	250	1000	500

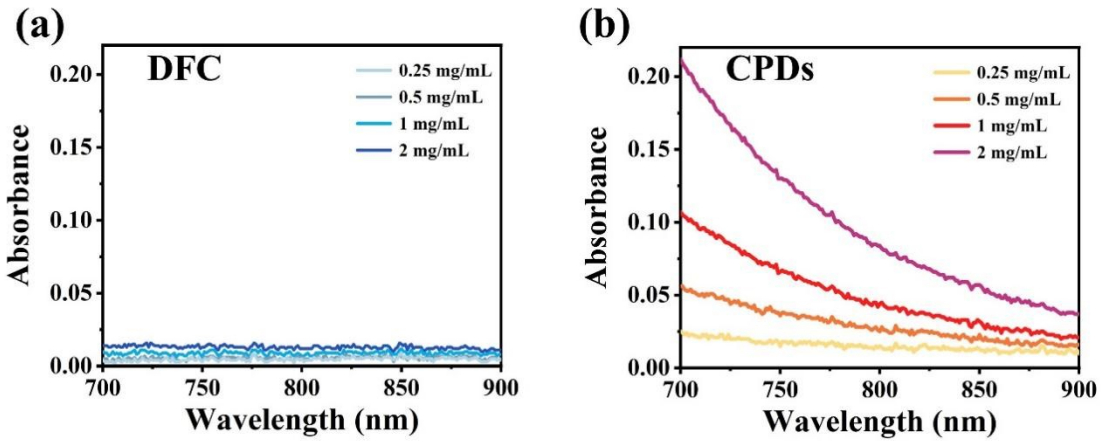

Figure. S2 UV-vis spectra for different concentrations of (a) DFC and (b) CPDs at 700-900 nm

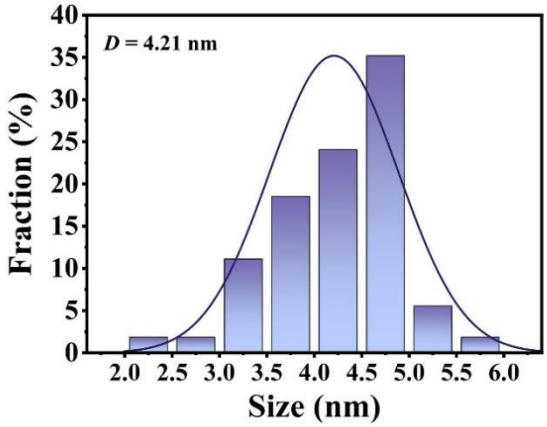

Figure. S3 Size distribution of CPDs