Electronic Supplementary Material (ESI) for Polymer Chemistry.

SUPPORTING INFORMATION

Non-Traditional Intrinsic Luminescence from Non-Conjugated Polymer Dots: Designing a Hybrid Biomaterial

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2. CHARACTERIZATION OF CARBON DOTS FROM β-GLUCAN

3. CHARACTERIZATION OF THE METALLIC NANOPARTICLES

Figure S1: DLS size distribution of hybrid nanomaterial sample showing a diameter of about 145 nm.

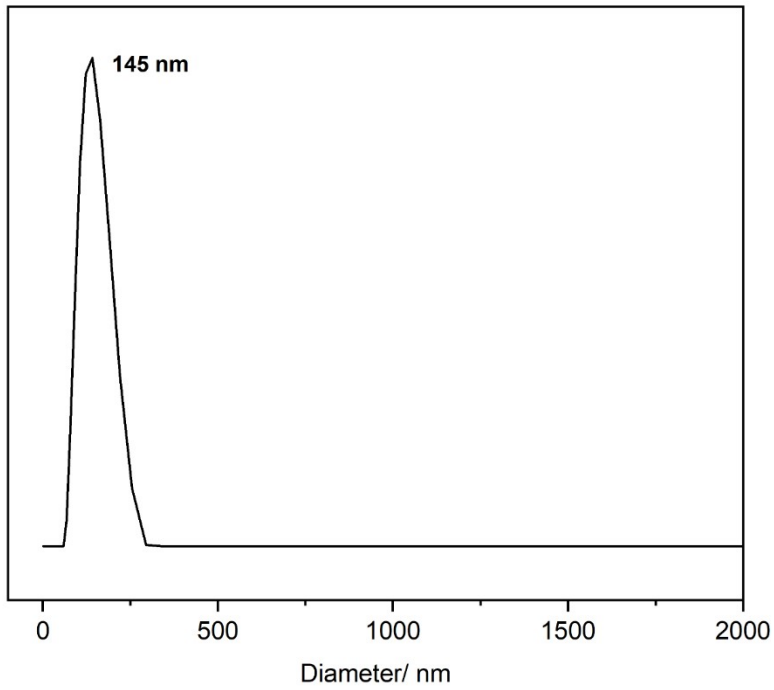

Figure S2: Different concentrations of NCPD (red) and quinine sulfate (blue), plotted by integrated PL intensity vs. absorbance and fitted for calculating the quantum yield, expressed in %.

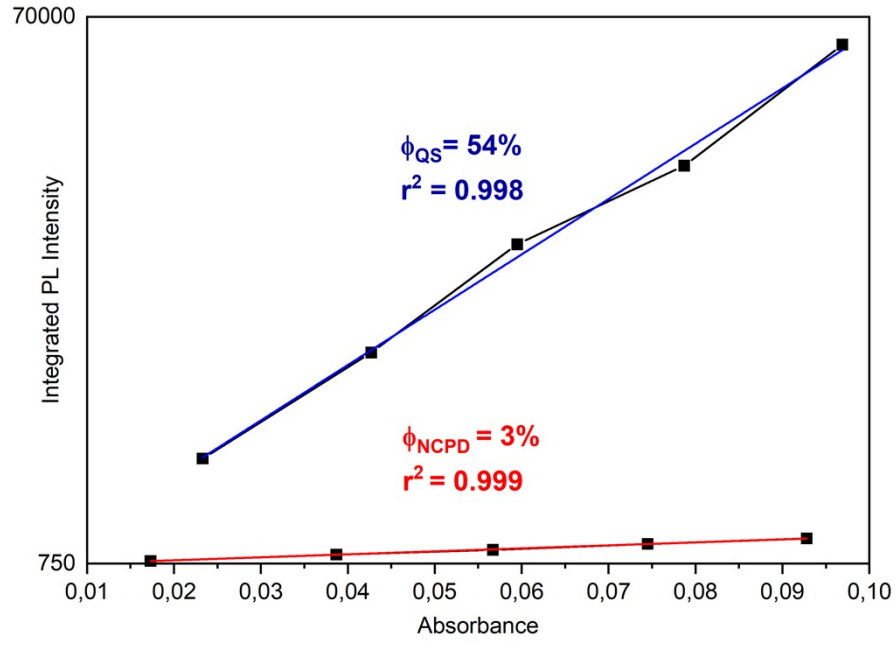

Figure S3: Elemental Analysis of NCPDs sample

NCPDs	% Carbon	% Hydrogen	% Nitrogen
Measurement 1	38.24	6.49	0.45
Measurement 2	38.35	6.56	0.48

Table S1: Tentative of vibrational assignment of NCPDs

FT-Raman	IR	SERS 633 nm		SERS 532 nm		Assignments
		AuNP	AgNP	AuNP	AgNP	
	3321 s					$\nu(NH_2)$, $\nu(OH)$
2967 sh						$\nu(CH_3)$
2932 s						$\nu(CH_2)$
2912 s	2912 m					$\nu(CH)$
	1708 w					$\nu(C=O)$
	1645 s				1656 w	Amide I
	1635 broad					$\delta(H_2O)$
1617 s			1616 m		1605 w	ν_{as} (COO^-), $\omega(CH_2)$, $\delta(NH_3)^+$
	1540 m				1547 w	Amide II
1459 m	1460 sh	1459 m	1460 m		1475 w	$\delta(CH_2)$
		1440 m	1440 m			$\beta(CH_2)$
1410 w						$\nu_s(COO^-)$, $\beta(CH_2)$
1367 s	1365 m	1367 m	1357 m		1365 w	$\delta(COH)$, $\delta(CH)$
1330 s	1330 m	1315 s	1315 s		1323 w	$\omega(CH_2)$, $\nu(COO^-)$, $\delta(NH_3)^+$
		1296 m	1293 m		1296 w	$\tau(CH_2, HCC)$
1259 w	1263 m	1254 m	1255 w			$\delta(CH)$, CH_2OH
1196 w	1196 w					$\delta(CH)$, CH_2OH
	1143 m	1143 w	1142 w			$\nu(COC)$, $\delta(COH)$, $\delta(OCH)$
1120 m						
1089 s	1067 sh	1089 w	1098 w			$\delta(CO)$
	1018 s					$\nu(CO)$
	996 sh					C-O valence vibration
893 w	893 m	889 m	889 w			δ(C1-H) - beta
765 m						$\omega(COO^-)$

Key: s – strong, m – medium, w – weak, sh – shoulder, ν - stretching, δ – bending, σ rocking, β- scissoring, ω- wagging.

Figure S4: UV/Vis absorption spectrum of the β-glucan chemically extracted from the Usnea lichen after the heating process to provide the carbon dots.

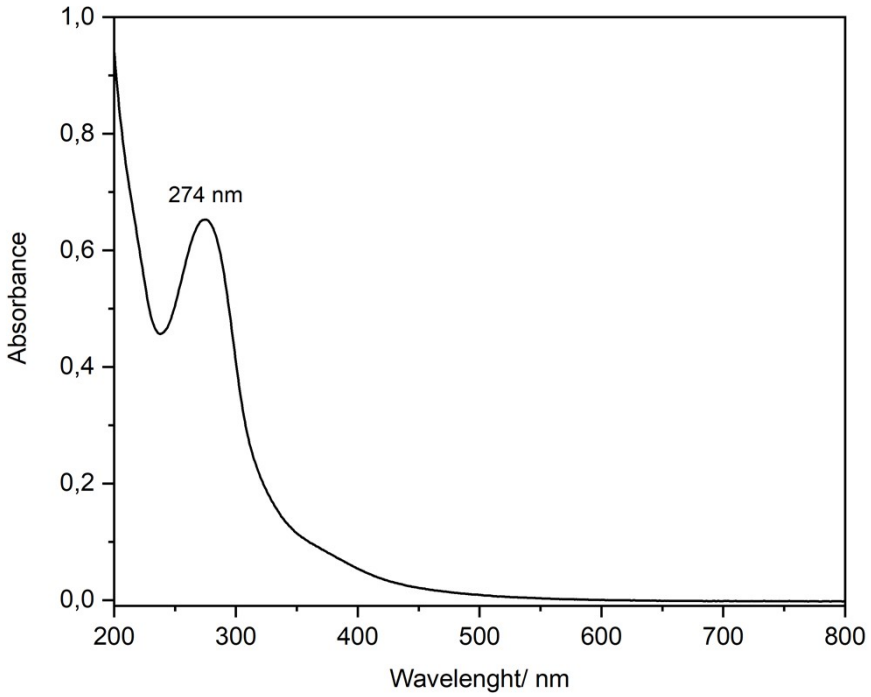

Figure S5: Emission-dependent PL spectra of the carbon dots from β-glucan

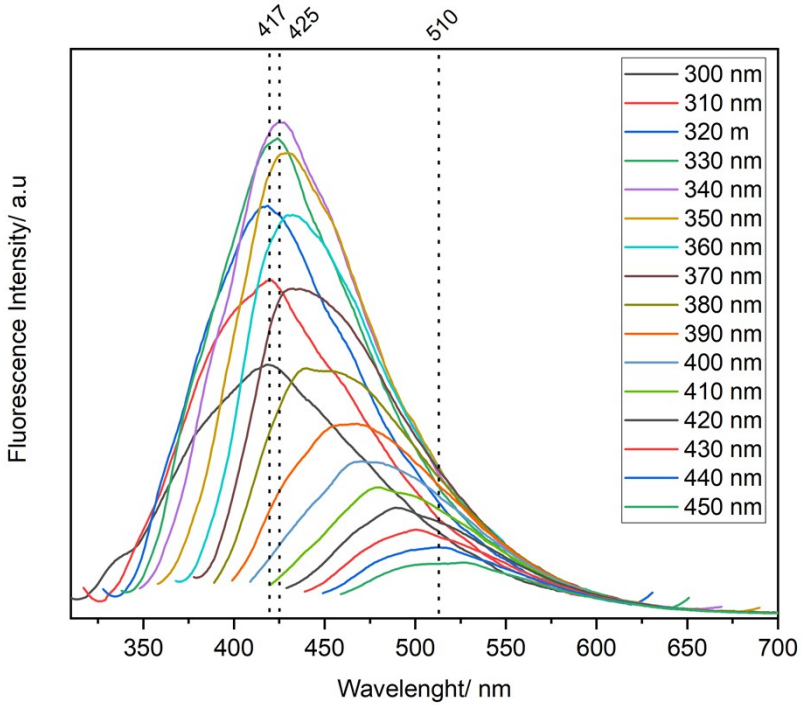

Figure S6: Different concentrations of carbon dots from β-glucan (red) and quinine sulfate (blue), plotted by integrated PL intensity vs. absorbance and fitted for calculating the quantum yield, expressed in %.

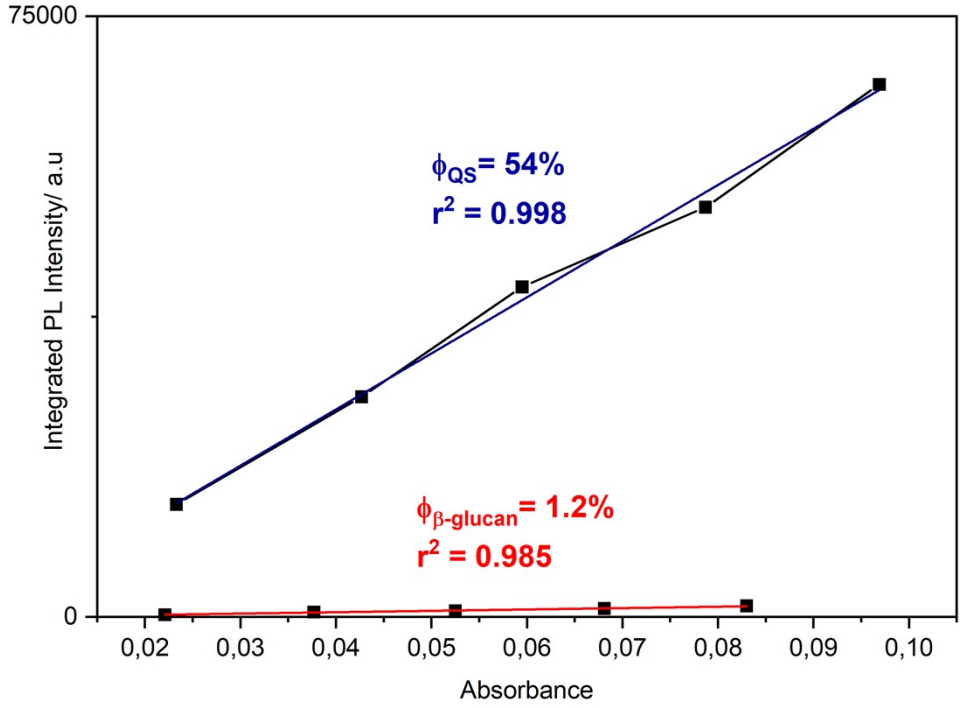

Figure S7: Raman spectra of the β-glucan before (red) and after (black) the heating process to provide the carbon dots showing the new band at 1630 cm^{-1} due to the ν(COO^-) vibrational mode.

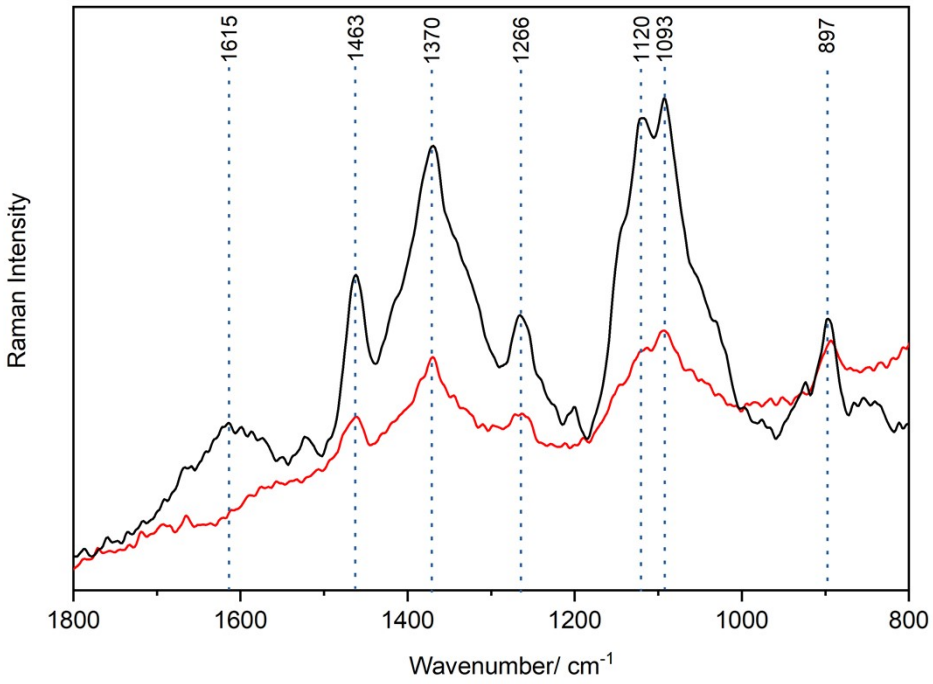

Figure S8: TEM images of A) AuNP and B) AgNP. Size distribution of C) AuNP and D) AgNP. The red and blue lines mean the size of nanoparticles.