

Supplementary Information

Gadolinium-doped carbon dots derived from peanut shell waste for bioimaging applications

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1. Methodology

FTIR deconvolution

Deconvolution of the FT-IR spectra was performed in the 1200–1750 cm⁻¹ range, where vibrational modes associated with protonated and deprotonated carboxyl groups appear. A linear baseline was subtracted prior to curve fitting. The spectral bands were assumed to follow Gaussian profiles and were deconvoluted using Origin 2018 software.

TEM and SEM-EDX analysis

Transmission Electron Microscopy (TEM) micrographs were acquired using a field-emission JEOL 2200FS electron microscope (JEOL Ltd., Akashima, Tokyo, Japan) operating at 200 kV. Samples were prepared by drop-casting or spraying of the powder suspension in propanol onto ultra-thin carbon-coated copper grids. Scanning electron microscopy (SEM) was performed using a Tescan VEGA3 microscope equipped with a tungsten filament (Tescan Orsay Holding, Brno, Czech Republic) operating at an acceleration voltage of 20 kV. The SEM was coupled with an Energy Dispersive X-ray Spectrometer (EDX) to analyze the structural

characteristics and elemental composition of the samples. EDX analysis was carried out in three different areas per sample, with the results reported as pie charts in Figure S4.

2. Results

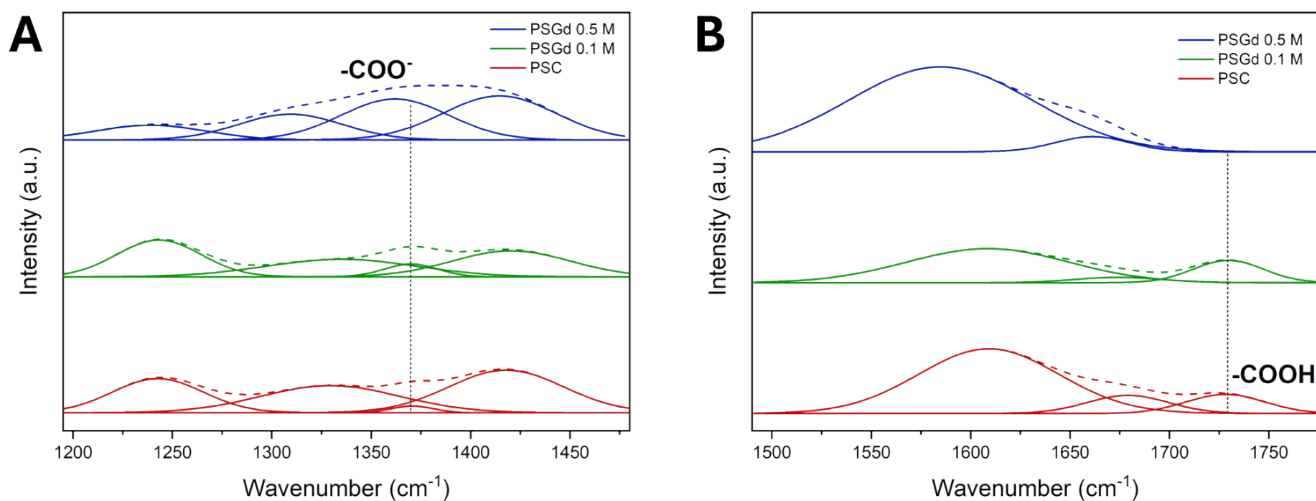


Figure S1. FTIR spectra deconvolution of CDs in the regions 1200-1450 cm⁻¹ (A) and 1500-1750 cm⁻¹ (B).

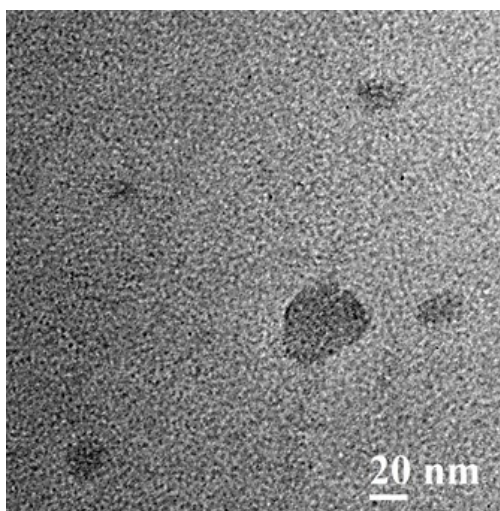


Figure S2. Representative TEM image of PSC.

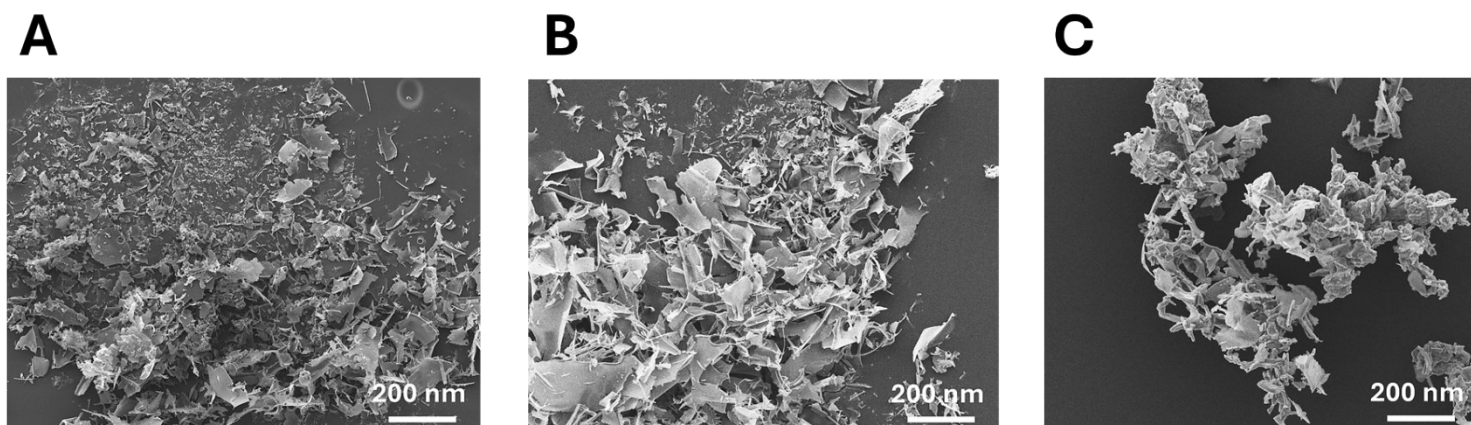


Figure S3. SEM micrographs of PSC (A), PSGd 0.1 M (B), and PSGd 0.5 M (C) samples.

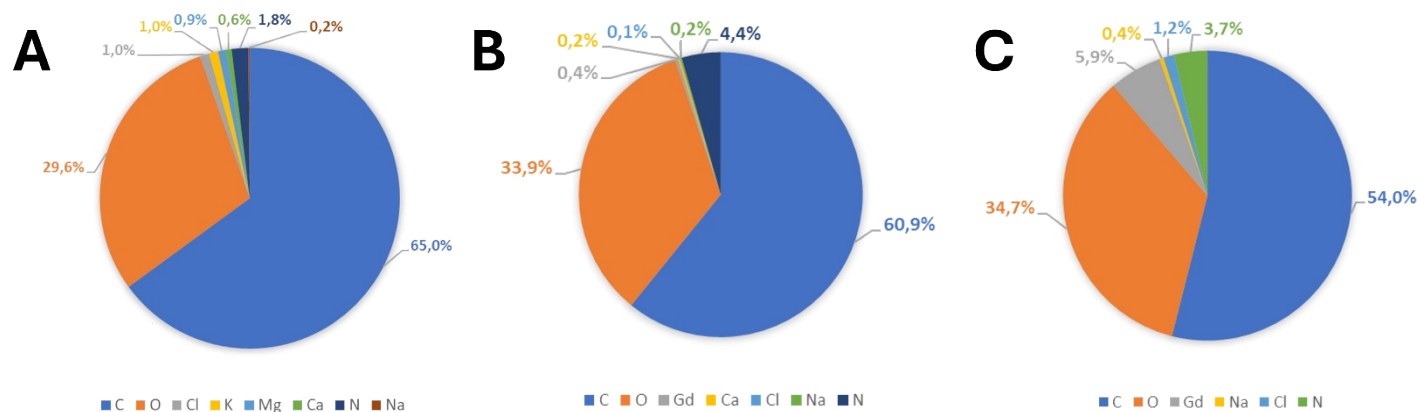


Figure S4. Elemental composition (average atomic percentage) of PSC (A), PSGd 0.1 M (B), and PSGd 0.5 M (C) samples, as determined by Energy-Dispersive X-ray Spectroscopy (EDX).

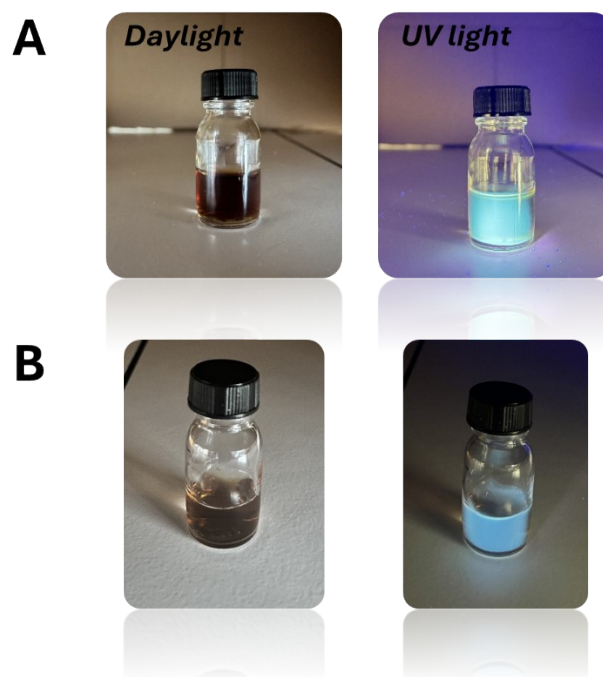


Figure S5. Photographs of PSC (A) and PSGd 0.1 M (B) under daylight and UV irradiation.

Table S1. Gd concentration in the wells of the mouse phantom.

N° of well	Sample Name	Gd content (μM)
1	—	—
2	—	—
3	GdCl ₃ (3 mM in H ₂ O)	3000
4	AGuIX® (1 mg/ml in H ₂ O)	826.7
5	H ₂ O	0
6	PSC (6.4 mg/ml in H ₂ O)	0
7	PSGd 0.1M (6.4 mg/ml in H ₂ O)	108.1
8	—*	—*
9	—*	—*

* Data not related to this research.