

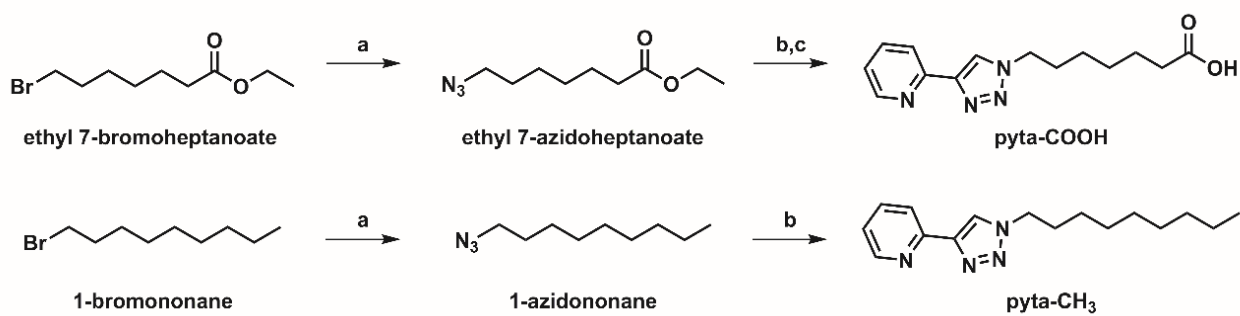
# **Iridium-functionalized cellulose microcrystals as a novel luminescent biomaterial for biocomposites**

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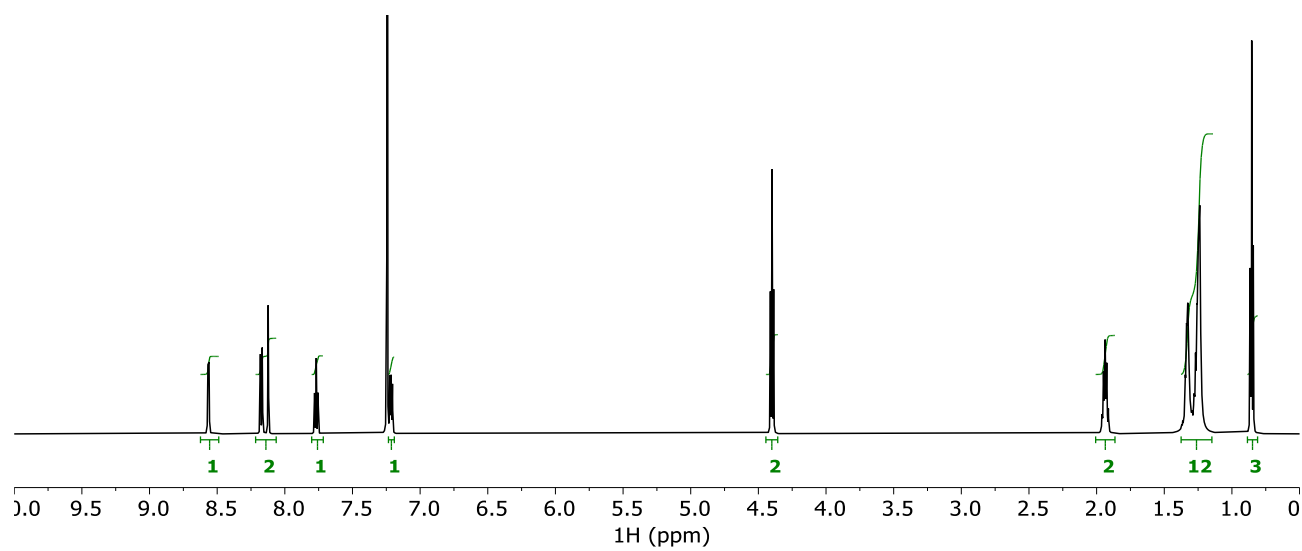
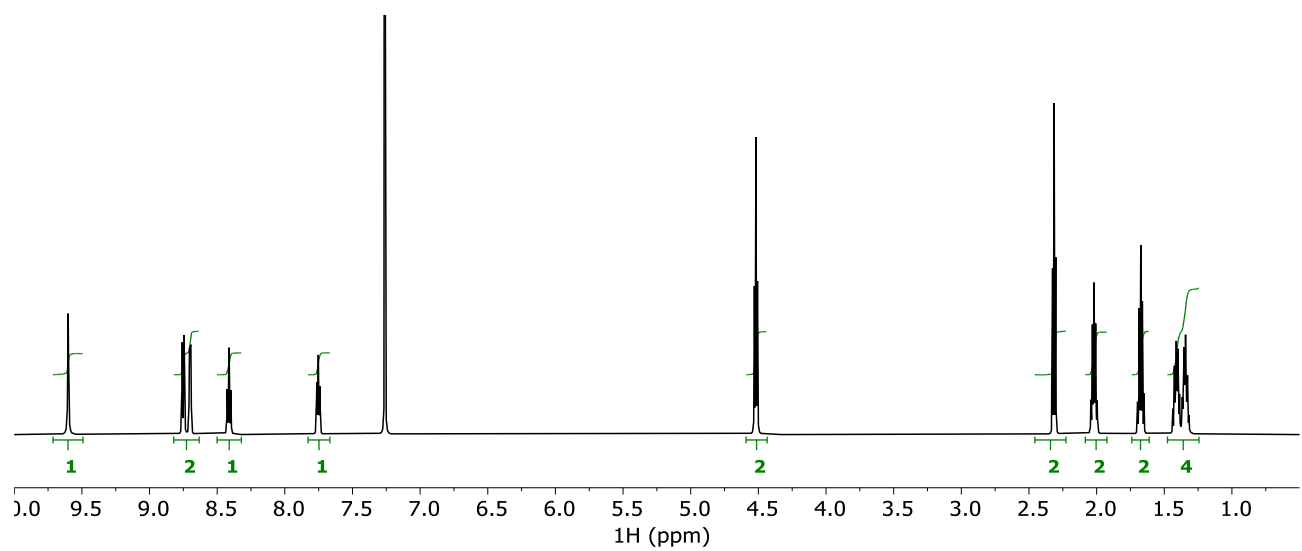
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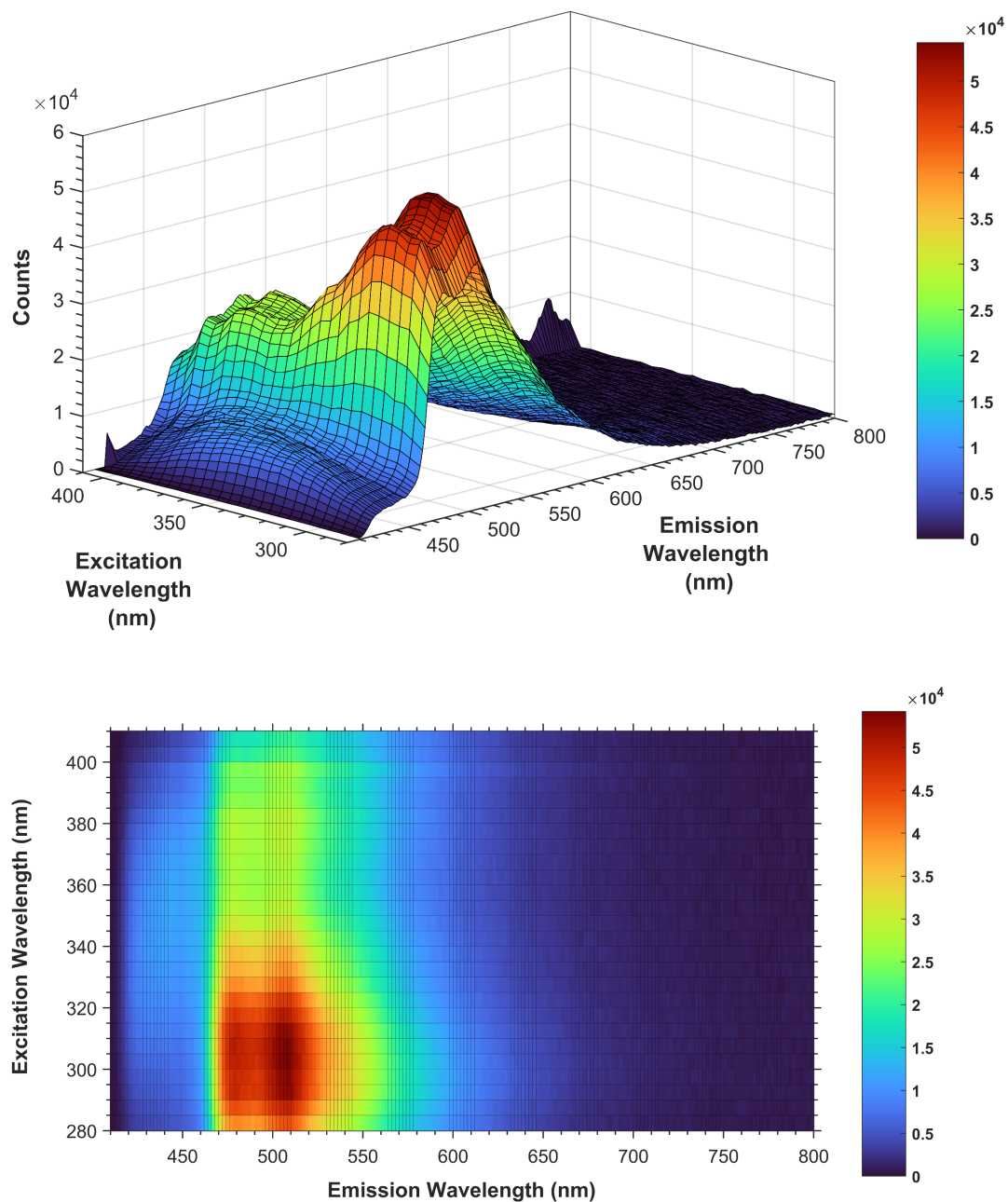
## **SUPPORTING INFORMATION**



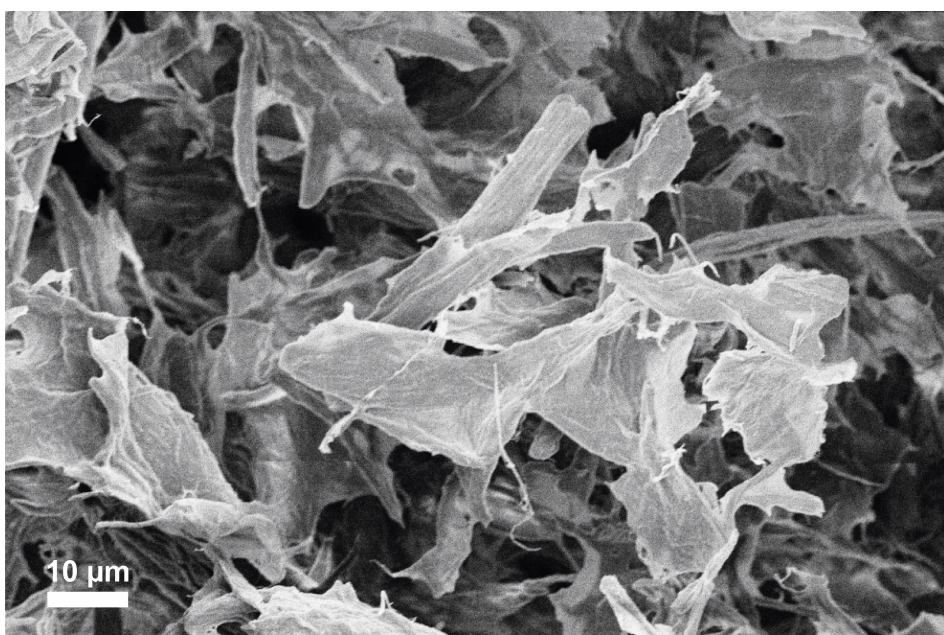
**Figure S1.** Synthesis of the pyridyl triazole ligands. Reaction conditions: a)  $\text{NaN}_3$ , DMSO, r.t., 24 h; b) 2-ethynylpyridine,  $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ , Na-ascorbate, t-BuOH/ $\text{H}_2\text{O}$  1:1, r.t., 24 h; c) KOH, DCM:EtOH: $\text{H}_2\text{O}$  8:3:1, r.t., 48 h.



**Figure S2.** <sup>1</sup>H-NMR (600 MHz, chloroform-*d*) of pyta-COOH (top) and pyta-CH<sub>3</sub> (bottom).



**Figure S3.** Emission maps of MCC-Ir. The same emission data are represented with a 3D surface plot (top) and with a colour-scale 2D image plot (bottom). Colour scale bars represent counts of the photodetector.



**Figure S4.** SEM image of MCC-OH

### Photostability experiments

The double exponential decay represents the sum of two exponentially decreasing functions, each one being ruled by the corresponding decay constant  $k$ . Since the values of the decay constants are very different, the photobleaching decay is characterized by a fast initial decrease in the emission intensity, followed by a slower decay over prolonged exposures. The coefficient  $\alpha$ , instead, relates to the relative percentage of fast vs. slow decay, revealing that the fast exponential decay is mainly limited to small radiant exposures ( $\alpha \sim 10\%$  in both cases).

	$\alpha$	$k_1$ $\left[\left(\frac{J}{cm^2}\right)^{-1}\right]$	$k_2$ $\left[\left(\frac{J}{cm^2}\right)^{-1}\right]$	Goodness of fit ( $R^2$ )
MCC-Ir	10.35%	$5.824 \cdot 10^{-3}$	$7.231 \cdot 10^{-5}$	0.9885
[Ir(ppy) <sub>2</sub> (pyta-COOH)]Cl in PMMA	11.97%	$3.434 \cdot 10^{-3}$	$4.790 \cdot 10^{-5}$	0.9901

**Table S1.** Fitting parameters for the double exponential decay of phosphorescence intensity during the photostability experiment on MCC-Ir powder and [Ir(ppy)<sub>2</sub>(pyta-COOH)]Cl in PMMA, according to **Equation 1**.