Supporting Information

Fluorescence Detection of Malachite Green and Cations (Cr\textsuperscript{3+}, Fe\textsuperscript{3+} and Cu\textsuperscript{2+}) by A Europium-Based Coordination Polymer

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Materials and instrumentation

All reagents and solvents were commercially available and used as received without further purification. The IR absorption spectra of these complexes were recorded in the range of 400-4000 cm\(^{-1}\) by means of a Nicolet (Impact 410) spectrometer with KBr pellets. PXRD measurements were performed on a Bruker D8 Advance X-ray diffractometer using Cu-K\(\alpha\) radiation (0.15418 nm), in which the X-ray tube was operated at 40 kV and 30 mA. TG analysis was performed on a Perkin Elmer thermogravimetric analyzer from room temperature to 1000 °C with a heating rate of 10 K\(\cdot\)min\(^{-1}\) under N\(_2\) atmosphere. Photoluminescence spectra were recorded on the Hitachi 850 fluorescence spectrophotometer at ambient temperature.

Fig. S1 TGA plot Eu-PDCA.
Fig. S2 PXRD of Eu-PDCA.
Fig. S3 Fluorescence spectra of Eu-PDCA (ethanol suspension, 1.0 mL) before and after added various analytes (excited at 265 nm).
Fig. S4 Fluorescence spectra of Eu-PDCA (ethanol suspension, 1.0 mL) before and after
added different metal ions (excited at 265 nm).
**Fig. S5** Fluorescence spectra of Eu-PDCA (ethanol suspension, 1.0 mL) before and after added different anions (excited at 265 nm).

![Fluorescence spectra](image)

**Fig. S6** Liquid UV-vis spectra of Eu-PDCA, MG, Cr$^{3+}$, Fe$^{3+}$ and Cu$^{2+}$.

**Table S1** Selected bond lengths (Å) and angles (˚) for Eu-PDCA.

| Bond                  | Length (Å) | Angle (˚)     |
|-----------------------|------------|---------------|
| Eu(1)-O(5)            | 2.3881(16) | O(5)-Eu(1)-O(7) 80.15(6) |
| Eu(1)-O(8)            | 2.4291(17) | O(8)-Eu(1)-O(7) 97.17(7) |
| Eu(1)-O(7)            | 2.4369(16) | O(5)-Eu(1)-O(4) 71.82(6) |
| Eu(1)-O(4)            | 2.4387(15) | O(8)-Eu(1)-O(4) 70.41(6) |
| Eu(1)-O(2)            | 2.4632(16) | O(7)-Eu(1)-O(4) 74.38(6) |
| Eu(1)-O(9)            | 2.5109(16) | O(5)-Eu(1)-O(2) 85.75(6) |
| Eu(1)-N(4)            | 2.5613(18) | O(8)-Eu(1)-O(2) 78.34(7) |
| Eu(1)-N(3)            | 2.563(2)   | O(2)-Eu(1)-N(4) 62.92(6) |
|                       |            | O(9)-Eu(1)-N(4) 65.28(6) |
|                       |            | O(8)-Eu(1)-N(3) 73.38(6) |
|                       |            | O(7)-Eu(1)-N(3) 63.00(6) |
| Property                          | Value                  |
|----------------------------------|------------------------|
| Empirical formula                | $C_{14}H_{14}EuN_2O_{14}$ |
| Formula weight                   | 590.27                 |
| Crystal color                    | Yellow                 |
| Crystal size (mm)                | 0.16 x 0.15 x 0.12     |
| Crystal system                   | Monolinic              |
| space group                      | $P2_1/c$               |
| a (Å)                            | 14.0026(6)             |
| b (Å)                            | 11.2217(5)             |
| c (Å)                            | 12.8398(5)             |
| α (deg)                          | 90.00                  |
| β (deg)                          | 102.4680(10)           |
| γ (deg)                          | 90.00                  |
| Volume (Å$^3$)                   | 1969.98(14)            |
| Z                                | 2                      |
| $d_{calcd}$ (g/cm$^3$)           | 1.990                  |
| μ (mm$^{-1}$)                    | 3.262                  |
| F (000)                          | 1164.0                 |
| λ (Å)                            | 0.71073                |
| Temperature                      | 293(2) K               |
| θ range (deg)                    | 1.49 to 27.21          |
| h, k, l range                    | -16<=h<=12             |
|                                  | -12<=h<=14             |
|                                  | -17<=h<=17             |
| Reflections collected / unique   | 11853 / 8500           |
|                                  | [R(int) = 0.0120]      |
| Completeness to θ               | 97.0 % (θ = 27.21)     |
| Data / restraints / parameters   | 8500 / 2 / 595         |
| Goodness-of-fit on F$^2$         | 1.049                  |
| Final R indices [I>2σ(I)] $^a$   | R1 = 0.0171            |
|                                  | wR2 = 0.0413           |
| R indices (all data)             | R1 = 0.0203            |
|                                  | wR2 = 0.0423           |
| Largest diff. Peak               | 0.619                  |
| and hole(e·Å$^{-3}$)             | and -0.470             |