

Exploring photochemical potential of a new Cd(II) complex with pyrazole derivative

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INTRODUCTION & AIM

- Conjugated C=N ligands enhance photophysical properties due to π -electron delocalization, while Ag(I) coordination polymers, although photophysically active, are limited by higher reactivity and lower stability

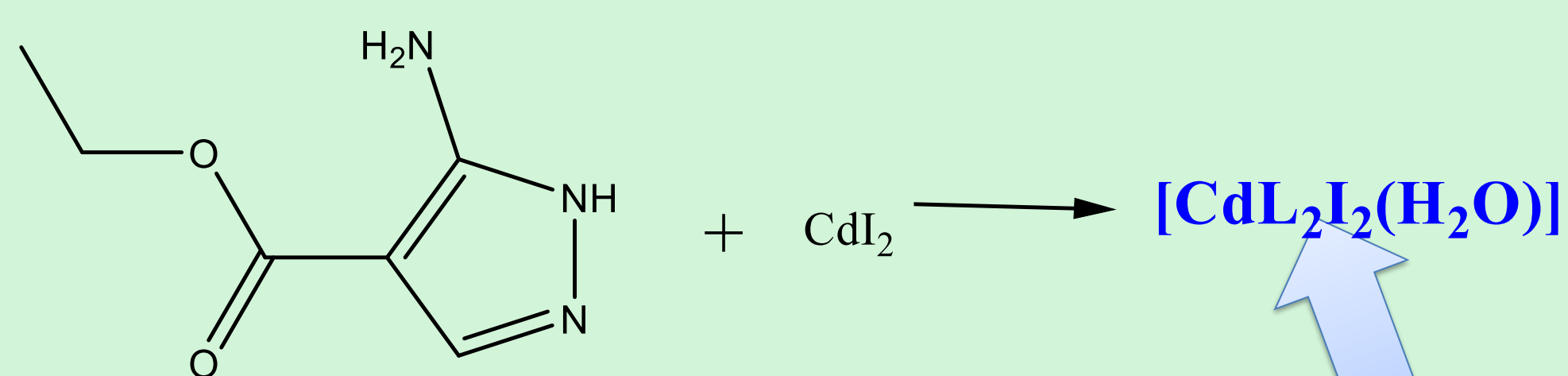
- Cd(II) is investigated as a more stable alternative with favorable coordination flexibility for designing luminescent materials

- Synthesis and structural characterization of a new Cd(II) complex, $[\text{CdL}_2\text{I}_2(\text{H}_2\text{O})]$

- Investigation of its photochemical and photoluminescent properties and evaluation of Cd(II)-based systems as viable alternatives to Ag(I) compounds

METHOD

Direct synthesis using warm solutions of L and a metal salt



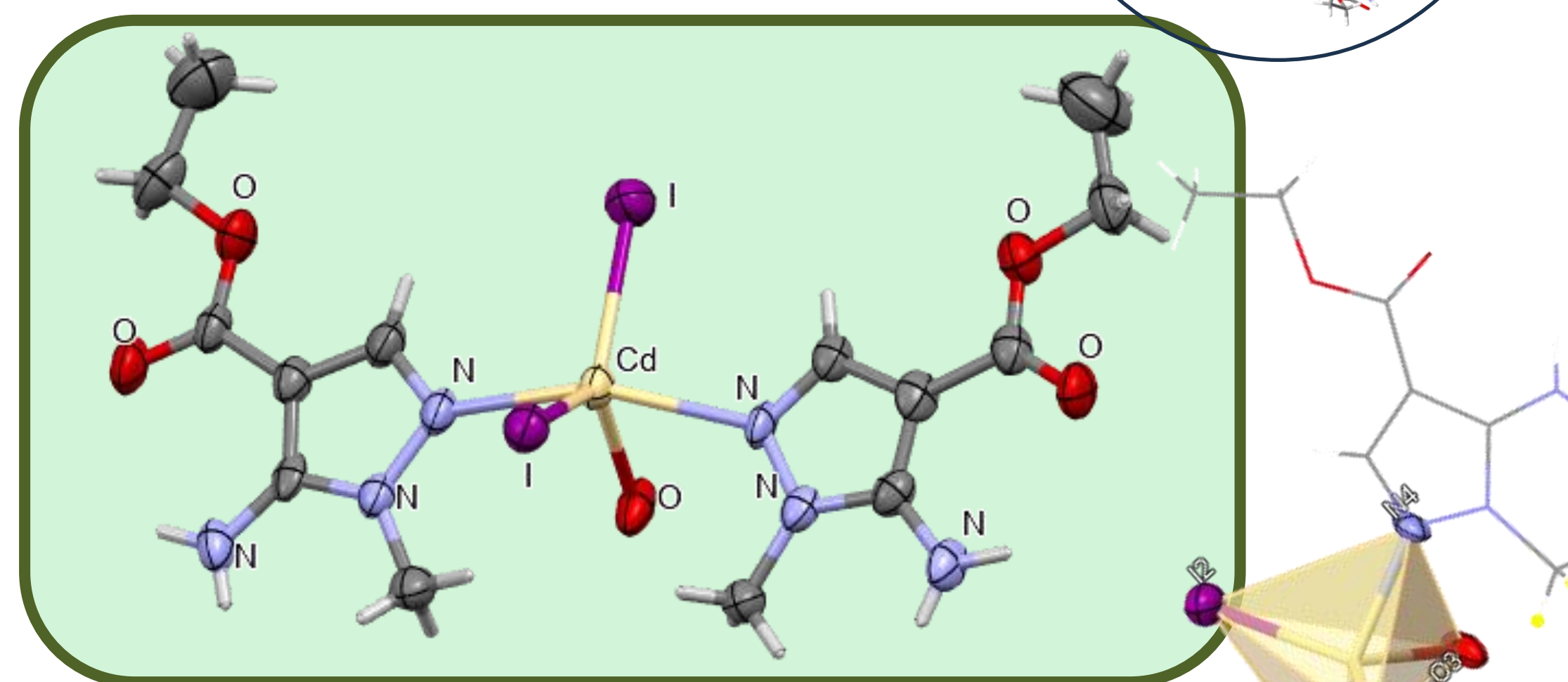
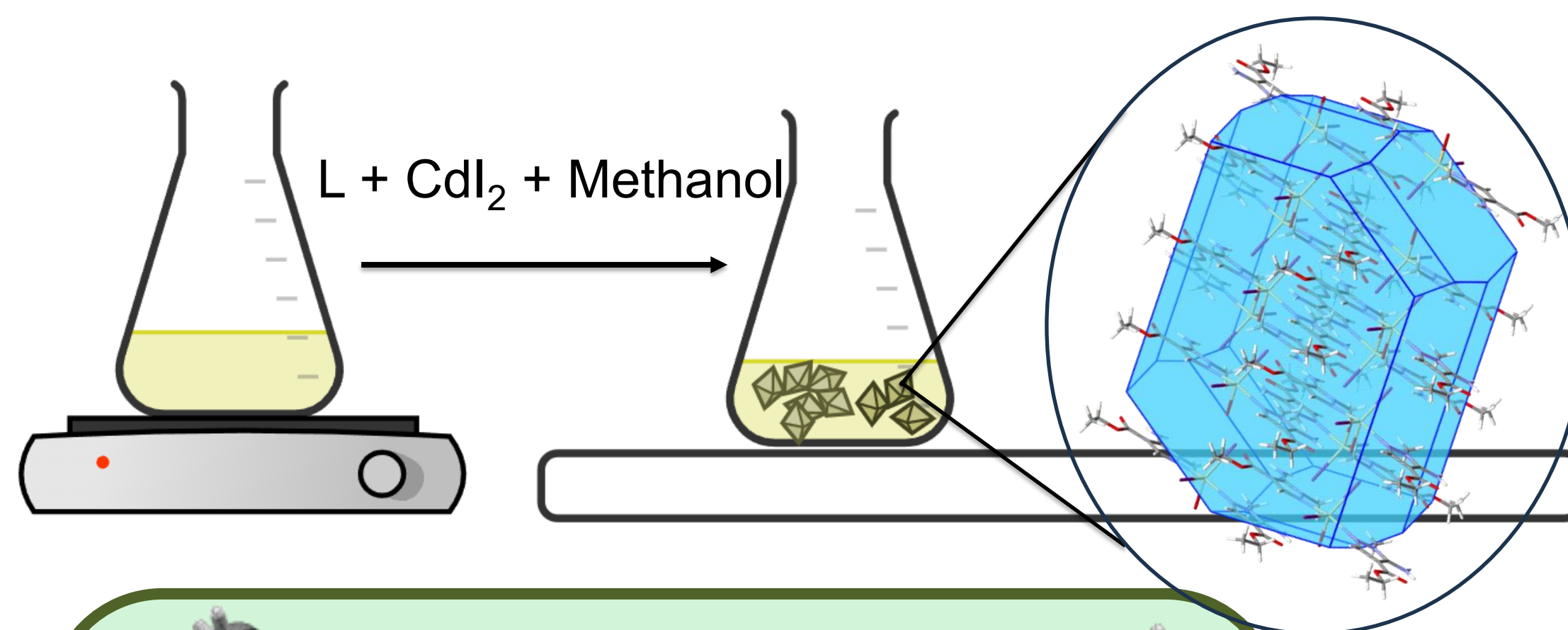
FTIR, SC-XRD, Elemental analysis

Crystallographic data:

triclinic crystal system, P, $a = 7.2688(7)$, $b = 9.8611(5)$, $c = 18.3530(13)$ Å, $\alpha = 74.578(5)$, $\beta = 89.944(7)$, $\gamma = 68.920(7)^\circ$, $V = 1176.71(16)$ Å³, $Z = 2$

- Fluorescence of the selected complex was measured at room temperature
- Excitation source: UV solid-state laser ($\lambda = 355$ nm, CiviLaser 355nm DPSS 20mW Pulsed Laser)
- Emission was collected using a lens and transmitted via optical fiber
- Spectral analysis performed with a spectrophotometer
- Measurements conducted under identical experimental conditions

RESULTS & DISCUSSION



Bond	Length, Å
Cd2– I2	2.724(2)
Cd2– N20	2.36(1)
Cd2– I1	2.844(2)
Cd2– O3	2.34(1)
Cd2– N4	2.36(1)

- Strong near-UV/blue fluorescence from ligand-centered $\pi \rightarrow \pi^*$ transitions.
- Emission maximum at 393 nm (powder and pellet).
- FWHM: 72 nm (powder), 80 nm (pellet).
- Intensity increases from 44 600 to 151 687 a.u. upon pelletization.

CONCLUSION

Straightforward synthesis of $[\text{CdL}_2\text{I}_2(\text{H}_2\text{O})]$ makes it a promising Cd(II) luminophore for studying structure–property relationships in photoluminescent materials.

FUTURE WORK

- Ligand modification and new Cd(II)/Zn(II) systems
- Detailed photophysical studies
- Application in luminescent materials