

Short Note

catena-Poly[[diaqua(nitrato- κ O)(nitrato- κ^2 O, O')(μ -2,5-bis[(pyridin-3-yl)ethynyl]thiophene- κ N: κ N')cadmium(II)] hydrate]

Enrico Podda ^{1,2,*} , James B. Orton ³, Simon J. Coles ³ , Vito Lippolis ¹ , Anna Pintus ¹ , Massimiliano Arca ¹  and M. Carla Aragoni ^{1,*} 

- ¹ Dipartimento di Scienze Chimiche e Geologiche, Università degli Studi di Cagliari, S.S. 554 bivio Sestu, 09042 Monserrato (Cagliari), Italy; lippolis@unica.it (V.L.); apintus@unica.it (A.P.); marca@unica.it (M.A.)
² Centro Servizi di Ateneo per la Ricerca (CeSAR), Università degli Studi di Cagliari, S.S. 554 bivio Sestu, 09042 Monserrato (Cagliari), Italy
³ UK National Crystallography Service, School of Chemistry, Faculty of Engineering and Physical Sciences, University of Southampton, Southampton SO17 1BJ, UK; j.b.orton@soton.ac.uk (J.B.O.); sjc5@soton.ac.uk (S.J.C.)
 * Correspondence: enrico.podda@unica.it (E.P.); aragoni@unica.it (M.C.A.)

Abstract

The reaction of $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ with the fluorescent ditopic N-donor ligand 2,5-bis[(pyridin-3-yl)ethynyl]thiophene (**L**) afforded the new coordination polymer $[\text{Cd}(\text{L})(\text{H}_2\text{O})_2(\text{NO}_3)_2] \cdot 1.25\text{H}_2\text{O}]_n$ (**1**). Single-crystal X-ray diffraction analysis revealed that the Cd^{II} centre is heptacoordinated and adopts a distorted pentagonal-bipyramidal coordination geometry, with two bridging **L** ligands in the axial positions and water molecules and nitrate anions occupying the equatorial plane. The antiperiplanar conformation of **L** promotes the formation of zigzag polymeric chains, which are further assembled through O–H $\cdots$ O hydrogen bonds and π – π stacking interactions into a 3D supramolecular network containing solvent-accessible channels. Compound **1** was further characterised by FT-IR spectroscopy, melting point determination, and solid-state absorption and emission spectroscopy.

Keywords: coordination polymers; cadmium(II); polypyridyl donor; SC-XRD

1. Introduction

Coordination polymers (CPs), generated by the self-assembly of metal ions or clusters with charged and/or neutral ligands, represent a particularly versatile family of crystalline hybrid materials. Their remarkable structural diversity arises from the interplay of metal–ion coordination preferences, ligand shape and denticity, counterions, cocrystallised solvent molecules, and reaction conditions, which collectively govern the dimensionality, topology, crystal packing, and functional response of the resulting networks. This structural and chemical versatility makes CPs attractive platforms for a broad range of applications, including both gas storage and separation, catalysis, sensing, and optoelectronics [1–6].

Among CPs, metal–organic frameworks (MOFs) constitute the porous subclass that has most strongly shaped the development of reticular chemistry [7,8]. The importance of this field was recently recognized by the 2025 Nobel Prize in Chemistry, awarded to Susumu Kitagawa, Richard Robson, and Omar M. Yaghi “for the development of metal–organic frameworks” [9]. MOFs are typically assembled from metal ions or metal-containing secondary building units (SBUs) connected by multitopic organic linkers, giving rise to



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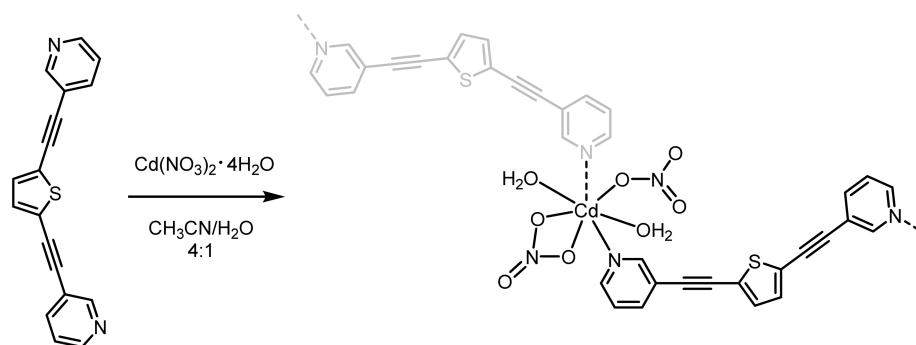
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crystalline architectures with guest-accessible voids and highly tuneable chemical environments [6].

The rapid expansion of MOF chemistry has been greatly impacted by the use of charged oxygen-donor linkers, especially carboxylates, which can coordinate metal centres and promote the formation of robust and directional metal–carboxylate SBUs [10,11]. This strategy has been central to the development of isorecticular families of MOFs, in which framework metrics and pore environments can be systematically varied while preserving the underlying network topology [12]. In parallel, neutral N-donor ligands, particularly pyridyl-based spacers, provide a complementary design approach to charged oxygen-donor linkers. Their coordination through pyridyl nitrogen atoms, combined with the tuneable length, shape, flexibility, and donor-site orientation of the organic backbone, makes them versatile building blocks for the construction of CPs [13–16]. The final architecture, however, is not solely dictated by the ligand itself; metal-ion coordination preferences, auxiliary ligands, counterions, solvent molecules, and crystallization conditions may significantly redirect the self-assembly process [17–19].

Pyridyl ligands with extended π -conjugated backbones are especially attractive as they may act both as bridging spacers and as photoactive chromophores. In CPs, the photoluminescence (PL) emission behaviour of these ligands can be modified by coordination-induced changes in molecular conformation, crystal packing, intermolecular π – π stacking and ligand-centred or charge-transfer excited states. Closed-shell d^{10} metal ions (such as Zn^{II} and Cd^{II}) are ideal for luminescent CPs as the absence of low-energy d – d transitions inhibits ligand-field-related quenching pathways, often allowing ligand-centred emission to be preserved or modulated within the crystalline framework [20–24].

Herein, we report the synthesis of a new Cd^{II} -based CP, obtained by reacting $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ with the fluorescent ditopic ligand 2,5-bis[(pyridin-3-yl)ethynyl]thiophene (**L**, Scheme 1). The resulting crystal structure of compound **1** was elucidated by single-crystal X-ray diffraction analysis and further characterised by FT-IR spectroscopy, melting point determination, solid-state UV–Vis absorption and emission spectroscopies.



Scheme 1. Preparation scheme of $\{[\text{Cd}(\text{L})(\text{H}_2\text{O})_2(\text{NO}_3)_2] \cdot 1.25\text{H}_2\text{O}\}_n$ (**1**) showing the primary coordination sphere around the metal ion in the resulting CP.

2. Results

The N-donor ligand 2,5-bis[(pyridin-3-yl)ethynyl]thiophene (**L**) was prepared *via* a Sonogashira cross-coupling reaction between 2,5-diiodothiophene and 3-ethynylpyridine, according to our previously reported procedure [25]. **L** has a π -conjugated backbone with a central thiophene core, connected to two meta-pyridyl units through ethynyl spacers. Depending on the relative orientation of the pyridyl groups, three limiting conformations can be envisaged: two periplanar and one antiperiplanar. Previous hybrid DFT calculations showed a negligible rotational barrier ($\sim 1 \text{ kcal mol}^{-1}$) for the interconversion between these conformations, highlighting the conformational adaptability of **L** during self-assembly

processes [25]. The Lewis-basic pyridyl nitrogen atoms make **L** suitable for coordinating to metal ions and interacting with main-group Lewis acids as demonstrated previously by the reaction of **L** with cyclic borasiloxanes to form solid-state luminescent chiral helices assembled through dative N–B bonds [25]. This prompted us to explore the still unreported coordination chemistry of **L** with metal ions. An equimolar amount of **L** was reacted with $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ in a $\text{CH}_3\text{CN}/\text{H}_2\text{O}$ mixture (4:1 *v/v*), affording a yellowish solution upon stirring at room temperature. After filtration, the solution was left undisturbed, and slow partial evaporation of the solvent afforded colourless crystals of compound **1** suitable for single-crystal X-ray diffraction (SC-XRD) analysis within 24 h.

The crystalline product was identified as a 1D CP with formula $[\{\text{Cd}(\text{L})(\text{H}_2\text{O})_2(\text{NO}_3)_2\} \cdot 1.25\text{H}_2\text{O}]_n$ (**1**), which crystallises in the orthorhombic space group *Pccn* (Tables S1–S3). The asymmetric unit consists of one **L** ligand connected to a heptacoordinated Cd^{II} ion (Figure 1).

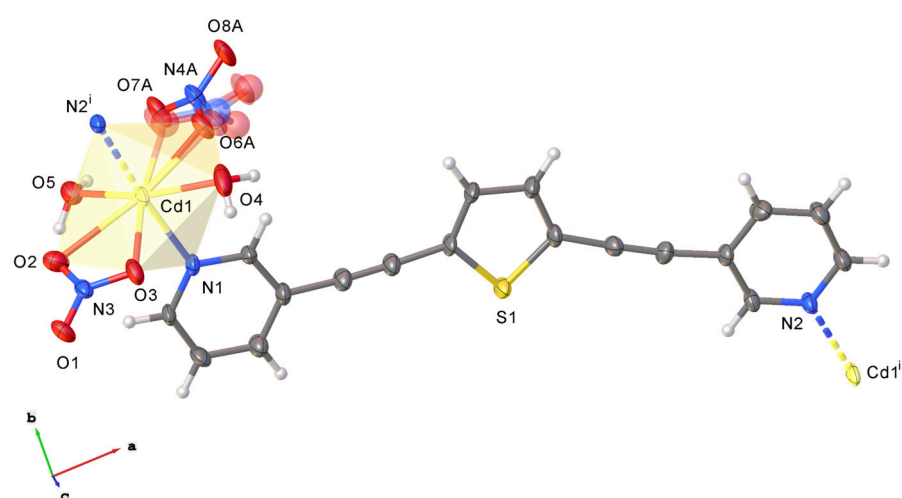


Figure 1. X-ray crystal structure of compound $[\{\text{Cd}(\text{L})(\text{H}_2\text{O})_2(\text{NO}_3)_2\} \cdot 1.25\text{H}_2\text{O}]_n$ (**1**), with the atom-labelling scheme adopted for heteroatoms. Atoms belonging to the minor components of the disordered nitrate anion were shown but not labelled for clarity. Displacement ellipsoids were drawn at 50% probability level. Symmetry codes: (i) $-1/2 + x, 1/2 + y, -z$; (ii) $1/2 + x, -1/2 + y, -z$.

Crystal data for compound **1**: $\text{C}_{18}\text{H}_{16.5}\text{CdN}_4\text{O}_{9.25}\text{S}$, ($M_r = 581.31 \text{ g mol}^{-1}$) orthorhombic, *Pccn*, $a = 28.0579(9) \text{ \AA}$, $b = 22.2561(7) \text{ \AA}$, $c = 7.0747(6) \text{ \AA}$, $V = 4417.9(4) \text{ \AA}^3$, $T = 100(2) \text{ K}$, $Z = 8$, $\rho_{\text{calc}} = 1.748 \text{ g/cm}^3$, $\mu(\text{Mo K}\alpha) = 1.142 \text{ mm}^{-1}$. The final R_1 was 0.0620 [$I \geq 2 \sigma(I)$], wR_2 was 0.1374 (all data) and the Goof was 1.157.

The **L** ligand adopts an antiperiplanar conformation, with the two pyridyl nitrogen atoms oriented in opposite directions. Overall, the molecule is nearly planar, with the pyridyl rings tilted slightly with respect to the central thiophene–ethynyl backbone (ca. 10°). The cadmium(II) centre displays a distorted pentagonal-bipyramidal coordination geometry, with two nitrogen atoms from symmetry-related bridging **L** ligands occupying the axial positions [Cd1–N1: 2.284(4); Cd1–N2ⁱ: 2.271(4) $\text{\AA}$; N1–Cd1–N2ⁱ: $175.57(13)^\circ$; (i) $-1/2 + x, 1/2 + y, -z$]. The equatorial plane is occupied by two coordinated water molecules [Cd1–O4: 2.331(5); Cd1–O5: 2.311(4) $\text{\AA}$], one chelating $\kappa^2\text{-O,O'}$ nitrate anion [Cd1–O2: 2.572(4); Cd1–O3: 2.504(4) $\text{\AA}$], and one monodentate $\kappa^1\text{-O}$ nitrate anion. The latter is disordered over three positions, with occupancies of 48.7%, 37.6%, and 13.7% respectively, and was modelled using rigid bodies (with idealised geometries) and with restraints and constraints applied to the atomic displacement parameters [Cd1–O6A: 2.349(8); Cd1–O6B: 2.511(12); Cd1–O6C: 2.49(3) $\text{\AA}$]. The divergent conformation of **L**, together with its bridging coordination mode, affords zigzag polymeric chains extending parallel to the *ab* plane

with a $\text{Cd1} \cdots \text{Cd1}^{\text{ii}}$ node separation of 17.93(4) Å [(ii) $1/2 + x, -1/2 + y, -z$], as shown in Figure 2.

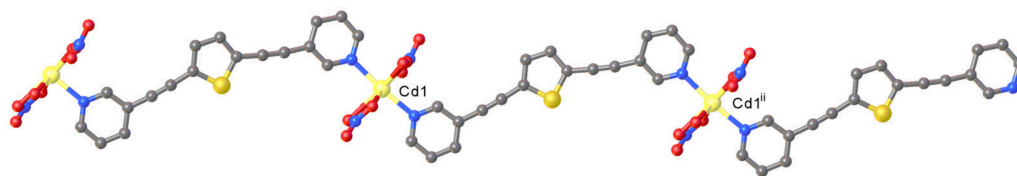


Figure 2. Portion of the zigzag polymeric chain of **1** viewed along the c -axis. Hydrogen atoms, minor components of the disordered nitrate anions, and cocrystallised water molecules were omitted for clarity. Symmetry code: (ii) $1/2 + x, -1/2 + y, -z$.

Adjacent zigzag chains are connected by an intricate network of $\text{O} \cdots \text{H} \cdots \text{O}$ hydrogen bonds involving the two coordinated water molecules and neighbouring nitrate anions, with donor $\cdots$ acceptor distances ranging from 2.472(11) to 2.969(6) Å (see Figure S1 and Table S4 for a complete description). As a result, the hydrogen-bonded chains are organised into supramolecular sheets parallel to the ab plane. Adjacent sheets are further associated through π - π stacking interactions involving pyridyl–pyridyl and pyridyl–thiophene contacts, with centroid-to-centroid distances in the range 3.60–3.82 Å (Figure S2). Overall, the crystal packing reveals a segregation between hydrophilic regions, defined by coordinated water molecules, nitrate anions, and lattice water molecules, and hydrophobic regions dominated by the aromatic backbone of **L**. This arrangement generates a three-dimensional supramolecular network containing perforated sheets and two solvent-accessible channels within the crystal structure (Figure 3). Residual electron density was found within these channels, strongly suggestive of disordered solvent water molecules, interacting through hydrogen bonds. The contents of the solvent channels could not be satisfactorily refined using a discrete atom model; a solvent mask was therefore applied (as implemented in Olex2) [26]. This accounted for the residual electron density in subsequent refinements and gave an estimated solvent content corresponding to 1.25 water molecules per formula unit.

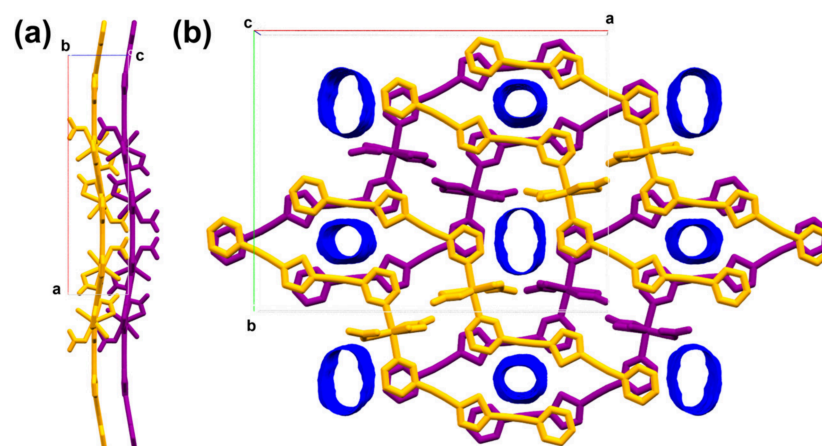


Figure 3. A portion of the crystal packing of **1** viewed down the b - (a) and c -axis (b). Zigzag chains belonging to the same hydrogen-bonded sheet were shown in the same colour. Hydrogen atoms, nitrate anions, coordinated water molecules, and cocrystallised water molecules were omitted for clarity. Solvent-accessible channels were highlighted in blue.

The solid-state FT-IR spectrum of **1** is consistent with its structural characterization and shows the band typical of the $\nu(\text{C}\equiv\text{C})$ stretching of the ethynyl groups at 2210 cm^{-1} , together with intense bands in the $1448\text{--}1311\text{ cm}^{-1}$ region assigned to nitrate vibrational modes (Figure S3). The solid-state diffuse reflectance spectrum of compound **1** shows

broad absorption bands in the 200–400 nm region, similar to those observed for the free ligand **L** (Figure S4). In the solid state, upon excitation at 350 nm, compound **1** displays an intense emission band centred at 495 nm, corresponding to a Stokes shift of 101 nm. This behaviour is consistent with the preservation of ligand-based emission in the Cd^{II} coordination polymer, although the emission band is noticeably broader than that of the free ligand.

3. Materials and Methods

3.1. General

Solvents and reagents were purchased from Sigma–Aldrich (St. Louis, MO, USA). **L** was prepared as previously described [25]. FT-IR measurements were recorded at room temperature using a Thermo-Nicolet 5700 spectrometer (Waltham, MA, USA), with KBr pellets, a KBr beam splitter and KBr windows (4000–400 cm^{−1}, resolution 4 cm^{−1}). Elemental analysis was performed using a CHNS/O Perkin Elmer 2400 series II elemental analyser (T = 925 °C) (Shelton, CT, USA). The melting point was determined on a FALC mod. C (up to 290 °C) apparatus. Diffuse reflectance measurements were carried out on an Agilent Cary 5000 UV–vis–NIR dual-beam spectrophotometer (Santa Clara, CA, USA) equipped with a diffuse reflectance accessory. Photoluminescence emission spectra were collected in the solid state using a Perkin Elmer LS55 fluorescence spectrometer (Shelton, CT, USA). X-ray diffraction data for **1** were collected at 100(2) K using a custom Rigaku FRE+ diffractometer (Tokyo, Japan), equipped with VHF VariMax confocal mirrors, an AFC12 4-circle goniometer, a HyPix-6000 detector and an Oxford Cryosystems low-temperature device. Data collection and processing were performed using CrysAlisPro V1.171.40.37a (Tokyo, Japan) [27]. The structure was solved with the ShelXT [28] solution program using dual methods, and the model was refined with ShelXL 2018/3 [29] using full-matrix least-squares minimization on F^2 . Olex2 1.5 [26] was used as the graphical interface. Selected crystallographic tables and further details of the refinement may be found in the Supplementary Information.

3.2. Synthesis of Compound **1**

L (11.4 mg, 4.0×10^{-5} mol) was dissolved in acetonitrile (2 mL). Cd(NO₃)₂·4H₂O (12.3 mg, 4.0×10^{-5} mol) was dissolved in H₂O (0.5 mL), and the resulting aqueous solution was added dropwise to the ligand solution under stirring. The resulting yellowish solution was filtered and left to slowly evaporate at room temperature. Colourless crystals of **1** were isolated after 24 h, washed with hexane, and air-dried. Yield: 5.4 mg; 9.2×10^{-6} mol; 23%. M. p. = 160 °C dec. Elemental analysis calcd. (%) for C₁₈H_{16.5}CdN₄O_{9.25}S: C 37.19, H 2.86, N 9.64, S 5.52. Found: C 37.12, H 2.79, N 9.60, S 5.59. FT-IR (KBr, 4000–400 cm^{−1}): 3236br, 3097w, 3066w, 2424w, 2393w, 2210m ν (C≡C), 1763w, 1618m, 1572mw, 1448ms, 1387vs, 1311s, 1196m, 1122m, 1051m, 1028m, 825s, 820m, 694s, 652w, 542w, 469w cm^{−1}.

4. Conclusions

The reaction between Cd(NO₃)₂·4H₂O and the ditopic pyridyl ligand **L** afforded the new Cd^{II} coordination polymer **1**. The crystal structure shows that **L** acts as a bridging N-donor ligand and adopts an antiperiplanar conformation, generating zigzag chains based on heptacoordinated Cd^{II} nodes. These chains assemble into a 3D supramolecular network through hydrogen-bonding interactions involving coordinated water molecules and nitrate anions, together with π – π contacts between the aromatic backbones. Solid-state optical measurements indicate that the ligand-based emission is preserved upon coordination to Cd^{II}, although the emission band of **1** is broader than that of the free ligand. These

results expand the coordination chemistry of this ligand and provide a basis for the future development of luminescent coordination polymers based on related π -conjugated spacers.

Supplementary Materials: The following supporting information can be downloaded online. Table S1: Crystal data and structure refinement parameters for compound **1**; Table S2: Bond lengths (Å) for compound **1**; Table S3: Bond angles (°) for compound **1**; Table S4: Hydrogen bonding interactions in compound **1**; Figure S1: Hydrogen bonding in compound **1**. Interactions are labelled according to Table S4, structure drawn using ball and stick style. N-donor molecules have been omitted for clarity; Figure S2: Intermolecular π - π stacking interactions in compound **1**, structure drawn using capped sticks style; Figure S3: Solid-state FT-IR (KBr, 4000–400 cm^{-1}) spectrum of compound **1**; Figure S4: Normalised solid-state diffuse reflectance spectra (left) and photoluminescence emission spectra recorded upon excitation at 350 nm (right) for compound **1** and **L**, shown as green and dashed black lines, respectively.

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Data Availability Statement: Crystallographic data were deposited at CCDC with deposition number 2582613. These data can be obtained free of charge from the CCDC via <https://www.ccdc.cam.ac.uk/structures> (accessed on 10 September 2026). Additional data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Lustig, W.P.; Mukherjee, S.; Rudd, N.D.; Desai, A.V.; Li, J.; Ghosh, S.K. Metal–Organic Frameworks: Functional Luminescent and Photonic Materials for Sensing Applications. *Chem. Soc. Rev.* **2017**, *46*, 3242–3285. [CrossRef]
2. Jiang, C.; Wang, X.; Ouyang, Y.; Lu, K.; Jiang, W.; Xu, H.; Wei, X.; Wang, Z.; Dai, F.; Sun, D. Recent Advances in Metal–Organic Frameworks for Gas Adsorption/Separation. *Nanoscale Adv.* **2022**, *4*, 2077–2089. [CrossRef]
3. Dutta, B.; Ahmed, F.; Mir, M.H. Coordination Polymers: A Promising Candidate for Photo-Responsive Electronic Device Application. *Dalton Trans.* **2023**, *52*, 17084–17098. [CrossRef]
4. Podda, E.; Arca, M.; Pintus, A.; Lippolis, V.; Coles, S.J.; Orton, J.B.; Porcu, S.; Ricci, P.C.; Aragoni, M.C. Ultra-Low Optical Loss in Single Crystal Waveguides of Fluorene/Fluorenone Cd^{II} Coordination Polymers. *JACS Au* **2025**, *5*, 727–739. [CrossRef]
5. Janiak, C. Engineering Coordination Polymers towards Applications. *Dalton Trans.* **2003**, *32*, 2781–2804. [CrossRef]
6. Han, Z.; Yang, Y.; Rushlow, J.; Huo, J.; Liu, Z.; Hsu, Y.C.; Yin, R.; Wang, M.; Liang, R.; Wang, K.Y.; et al. Development of the Design and Synthesis of Metal–Organic Frameworks (MOFs)—From Large Scale Attempts, Functional Oriented Modifications, to Artificial Intelligence (AI) Predictions. *Chem. Soc. Rev.* **2025**, *54*, 367–395. [CrossRef]
7. Yaghi, O.M.; O’Keeffe, M.; Ockwig, N.W.; Chae, H.K.; Eddaoudi, M.; Kim, J. Reticular Synthesis and the Design of New Materials. *Nature* **2003**, *423*, 705–714. [CrossRef]
8. Yaghi, O.M.; Kalmutzki, M.J.; Diercks, C.S. *Introduction to Reticular Chemistry: Metal-Organic Frameworks and Covalent Organic Frameworks*; Wiley: Hoboken, NJ, USA, 2019. [CrossRef]
9. Press Release: Nobel Prize in Chemistry 2025-NobelPrize.org. Available online: <https://www.nobelprize.org/prizes/chemistry/2025/press-release/> (accessed on 28 May 2026).
10. Saha, K.; Dutta, B.; Das, P.; Chandra, A.; Samanta, A.; Jana, S.R.; Naskar, S.; Saha, R.; Ray, P.P.; Sinha, C. Structure-Directing Effect of Terephthalate in Bridging Zn(II)- and Cd(II)-Based Coordination Polymers towards Application in the Detection of Trace Quantities of Pd^{2+} in Aqueous Media and Their Electrical Conductivities. *Dalton Trans.* **2025**, *54*, 3346–3361. [CrossRef]
11. Podda, E.; Arca, M.; Pintus, A.; Lippolis, V.; Caltagirone, C.; Coles, S.J.; Orton, J.B.; Ennas, G.; Picci, G.; Davies, R.P.; et al. On the Role of Torsional Dynamics in the Solid-State Fluorescent Properties of a New Bifluorene–Tetracarboxylic Acid and Its Supramolecular Assemblies: A Structural and TD-DFT Investigation. *CrystEngComm* **2023**, *25*, 1058–1066. [CrossRef]

12. Mai, Z.; Liu, D. Synthesis and Applications of Isoreticular Metal–Organic Frameworks IRMOFs- n ($n = 1, 3, 6, 8$). *Cryst. Growth Des.* **2019**, *19*, 7439–7462. [[CrossRef](#)]
13. Zhao, J.; Yuan, J.; Fang, Z.; Huang, S.; Chen, Z.; Qiu, F.; Lu, C.; Zhu, J.; Zhuang, X. One-Dimensional Coordination Polymers Based on Metal–Nitrogen Linkages. *Coord. Chem. Rev.* **2022**, *471*, 214735. [[CrossRef](#)]
14. Leong, W.L.; Vittal, J.J. One-Dimensional Coordination Polymers: Complexity and Diversity in Structures, Properties, and Applications. *Chem. Rev.* **2011**, *111*, 688–764. [[CrossRef](#)]
15. Pisačić, M.; Kodrin, I.; Trninić, A.; Đaković, M. Two-Dimensional Anisotropic Flexibility of Mechanically Responsive Crystalline Cadmium(II) Coordination Polymers. *Chem. Mater.* **2022**, *34*, 2439–2448. [[CrossRef](#)]
16. Đaković, M.; Pisačić, M.; Borovina, M.; Kodrin, I.; Kendel, A.; Frey, T. Unveiling Structure-Dynamic Processes in Crystals of 1D Cd(II) Coordination Polymers during the Elastic Flexible Events. *J. Am. Chem. Soc.* **2025**, *147*, 22219–22227. [[CrossRef](#)]
17. Podda, E.; Arca, M.; Coles, S.J.; Crespo Alonso, M.; Isaia, F.; Pintus, A.; Lippolis, V.; Aragoni, M.C. Supramolecular Assemblies Tailored by Dipyriddy-1,2-4-Thiadiazoles: Influence of the Building Blocks in the Predictability of the Final Network. *Supramol. Chem.* **2020**, *32*, 267–275. [[CrossRef](#)]
18. Aragoni, M.C.; Arca, M.; Cabras, V.; Coles, S.J.; Ennas, G.; Isaia, F.; Lai, R.; Lippolis, V.; Podda, E. Coordination Polymers Based on Dithiophosphato/Dithiophosphonato Nickel Complexes and Linear 1,4-Di(3-Pyridyl)Buta-1,3-Diyne Ligand. *Supramol. Chem.* **2017**, *29*, 853–864. [[CrossRef](#)]
19. Notash, B.; Rodbari, M.F. Anion-Controlled Structural Motifs in Cadmium Coordination Polymers: Formation of Linear Chain versus Triple-Stranded Ladder. *Polyhedron* **2019**, *171*, 260–268. [[CrossRef](#)]
20. Jiang, H.L.; Tatsu, Y.; Lu, Z.H.; Xu, Q. Non-, Micro-, and Mesoporous Metal–Organic Framework Isomers: Reversible Transformation, Fluorescence Sensing, and Large Molecule Separation. *J. Am. Chem. Soc.* **2010**, *132*, 5586–5587. [[CrossRef](#)]
21. Zhao, Z.H.; Yang, Q.Y.; Xu, X.R.; Tong, Z.Y. Luminescent Coordination Polymers with d^{10} Metal Centres for Cation Sensing: A Review. *Microchem. J.* **2025**, *215*, 114096. [[CrossRef](#)]
22. Liu, J.Q.; Luo, Z.D.; Pan, Y.; Kumar Singh, A.; Trivedi, M.; Kumar, A. Recent Developments in Luminescent Coordination Polymers: Designing Strategies, Sensing Application and Theoretical Evidences. *Coord. Chem. Rev.* **2020**, *406*, 213145. [[CrossRef](#)]
23. Cepeda, J.; Rodríguez-Diéguez, A. Tuning the Luminescence Performance of Metal–Organic Frameworks Based on d^{10} Metal Ions: From an Inherent Versatile Behaviour to Their Response to External Stimuli. *CrystEngComm* **2016**, *18*, 8556–8573. [[CrossRef](#)]
24. Zhang, X.D.; Hua, J.A.; Guo, J.H.; Zhao, Y.; Sun, W.Y. Cadmium(II) Coordination Polymers Based on 2-(4-((E)-2-(Pyridine-2-Yl)Vinyl)Styryl)Pyridine and Dicarboxylate Ligands as Fluorescent Sensors for TNP. *J. Mater. Chem. C* **2018**, *6*, 12623–12630. [[CrossRef](#)]
25. Podda, E.; Coles, S.J.; Horton, P.N.; Lickiss, P.D.; Bull, O.S.; Orton, J.B.; Pintus, A.; Pugh, D.; Aragoni, M.C.; Davies, R.P. First Example of Solid-State Luminescent Borasiloxane-Based Chiral Helices Assembled through N–B Bonds. *Dalton Trans.* **2021**, *50*, 3782–3785. [[CrossRef](#)]
26. Dolomanov, O.V.; Bourhis, L.J.; Gildea, R.J.; Howard, J.A.K.; Puschmann, H. OLEX2: A Complete Structure Solution, Refinement and Analysis Program. *J. Appl. Cryst.* **2009**, *42*, 339–341. [[CrossRef](#)]
27. *CrysAlisPro (V 1.171.40.37a)*; Rigaku Oxford Diffraction: Yarnton, UK, 2019.
28. Sheldrick, G.M. SHELXT-Integrated Space-Group and Crystal-Structure Determination. *Acta Cryst. A* **2015**, *71*, 3–8. [[CrossRef](#)]
29. Sheldrick, G.M. Crystal Structure Refinement with SHELXL. *Acta Cryst. C* **2015**, *71*, 3–8. [[CrossRef](#)]

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