**Supplementary information**

**A water-stable zwitterionic Cd(II) coordination polymer as fluorescent sensor for the detection of oxo−anions and dimetridazole in milk**

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Table S1 Selected bond lengths (Å) and bond angles (°) of **1**

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| --- |
| Bond lengths (nm) for **1** |
| Cd(1)−O(1) | 2.3976(17) | Cd(1)−O(6) |

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| --- | --- |
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| --- |
| 2.377(2) |

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 |
| Cd(1)−O(2) |

|  |
| --- |
| 2.401(2) |

 | O(1)−C(1) | 1.266(3) |
| Cd(1)−O(3) | 2.261(2) | N(1)−C(5) | 1.362(3) |
| Cd(1)−O(4) |

|  |
| --- |
| 2.3199(19) |

 | C(1)−C(2) | 1.498(3) |
| Cd(1)−O(5) | 2.219(2) | Cl(1)−O(13) | 1.404(3) |
| Bond angles (°) for **1** |
| O(1)−Cd(1)−O(2) |

|  |
| --- |
| 54.72(6) |

 | O(5)−Cd(1)−O(3) |

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| --- | --- |
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| --- |
| 125.12(8) |

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| O(3)−Cd(1)−O(1) |

|  |
| --- |
| 85.15(7) |

 | O(5)−Cd(1)−O(6) | 90.10(8) |
| O(3)−Cd(1)−O(2) | 134.88(7) | N(1)−C(5)−C(8) | 119.5(2) |
| O(4)−Cd(1)−O(1) | 89.17(7) | C(1)−O(1)−Cd(1) | 91.07(14)  |
| O(4)−Cd(1)−O(6) | 171.77(6) | C(5)−N(1)−C(7) |

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| 118.93(19) |

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Fig. S1 The Fourier Transform Infrared (FT-IR) spectrum of H2LCl (a) and complex **1** (b).



Fig. S2 (a) The connection mode of the [(Cd1)2(μ2-CO2)2] dinuclear subunit. (b) The 1D S-shaped chain in complex **1**.



Fig. S3 The PXRD patterns of complex **1** and water-treated of **1**.



Fig. S4 The TGA curve of complex **1**.





Fig. S5 The solid state luminescent spectrum of the ligand H2LCl (a) and complex **1** (b).



Fig. S6 The luminescence intensity of **1** water suspension in different inorganic anions.



Fig. S7 Competitive analyte test for other inorganic anions in the presence of Cr2O72−, CrO42− or MnO4− toward **1**.



Fig. S8 The luminescence intensity of **1** water suspension in different antibiotics.



Fig. S9 Competitive analyte test for other inorganic anions in the presence of DTZ toward **1**.



Fig. S10 PXRD curves of **1** after five sensing recovery cycles for DTZ.

Table S2 Comparison of Ksv and LOD values for CPs reported for aqueous phase sensing of Cr2O72−/ CrO42−/ MnO4−.

|  |  |
| --- | --- |
|  | CP based sensors oxo-anions *K*sv (M− 1) LOD Ref. |
| [Cd1.5(NTB)(bipy)0.5]*n* | Cr2O72− | 2.00 ​× ​103 | 2.23 ​× ​10−6 ​MH2O | Yang et al., 2022 |
| CrO42− | 1.65 × 104 | 1.60 ​× ​10−6 ​M | Yang et al., 2022 |
| [Cd(L)0.5(bpe)0.5(H2O)]*n* | Cr2O72− | 1.50 × 104 | 0.60 μM | Lei et al., 2022 |
| [Tb(L)(HCOO)(H2O)]*n* | Cr2O72− | 2.10 × 104 | 2.10 μM | Sun et al., 2017 |
| [Tb(PMBB)1.5(H2O)2] | Cr2O72− | 1.06 × 104 | 7.40 × 10−7 M | Zhou et al., 2022 |
| MnO4− | 8.87 × 103 | 8.83 × 10−7 M | Zhou et al., 2022 |
| {[Zn2(TRZ)2(DBTDC-O2)]·DMAc}*n* | Cr2O72− | 1.24× 104 | 2.55 μM | He et al., 2019 |
| {[Cd(L)(bdc)·2H2O]·2DMF}*n* | Cr2O72− | 4.25 × 104 | 10.5 μM | Ge et al., 2020 |
| Tb2(TDA)4(OOCCH3)2(H2O)2 | MnO4− | 1.59 × 104 | 0.612 μM | Yuan et al., 2021 |
| {[Zn6(L1)2(NDC)5(*μ*2-OH)2]·0.5H2O}*n* | MnO4− | 1.05 × 104 | 0.288 μM | Su et al., 2022 |
| {[Zn(L2)(NDC)]·2H2O}*n* | MnO4− | 5.48 × 103 | 0.242 μM | Su et al., 2022 |
| [Zn8L6(μ4-O)2⋅DMSO⋅(H2O)3] | MnO4− | 1.70 × 104 | 0.465 μM | Wang et al., 2021a |
| [Cd(IPA)(L)]n | Cr2O72− | 2.91 × 103 | 3.4 ​μMH2O | Parmar et al., 2017 |
| CrO42− | 1.30 × 103 | 3.4 ​μMH2O | Parmar et al., 2017 |
| [Zn3(L)(OH)(H2O)5]·NMP·2H2O | Cr2O72− | 6.6 × 104 | 6.05 × 10−5 M | Yan et al., 2018 |
| CrO42− | 1.3 × 104 | 4.29 × 10−4 M | Yan et al., 2018 |
| MnO4− | 1.1 × 104 | 3.38 × 10−4 M | Yan et al., 2018 |
| **CP 1** | **Cr2O72−** | **8.3191 × 104** | **0.12 μM** | **This work** |
| **CrO42−** | **6.0980 × 104** | **0.16 μM** |
| **MnO4−** | **3.3842 × 104** | **0.29 μM****0.3470(10)** |

**Table S3** Comparison of *K*sv and LOD values for CPs reported for aqueous phase sensing of DTZ.

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| CP based sensors *K*sv (M− 1) LOD Ref. |
| [Pb1.5(DBPT)]2·(DMA)3(H2O)4 | 1.5 × 104 | 20 ppmH2O | Sun et al., 2019 |
| [Tb(TATAB)(H2O)]·2H2O·CH3OH | 3.42 × 104 | 0.0808H2O | Wei et al., 2019 |
| [Cd2+ complex] | 0.70 × 104 | 0.73 nMH2O | Ji et al., 2021 |
| [Tb(H2O)(BTCTB)]**·**2H2O | 1.62 × 104 | 2.9 μM | Yang et al., 2020 |
| [Cd3(DBPT)2(H2O)4]**·**5H2O | 1.70 × 104 | 10 μM | Dong et al., 2018 |
| DMASM@Zn2L(H2O)2]*·*4H2O·3DMF | 3.20 × 104 | – | Wang et al., 2022 |
| [Eu2(dtztp)(OH)2(DMF)(H2O)2.5]·2H2O | 2.45 × 104 | 13.4 ppm | Wang et al., 2021b |
| **CP 1** | **1.1085 × 105** | **0.09 μM****0.3470(10)** | **This work** |

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