Supplementary Information

Enhanced Luminescent Sensing of Pymetrozine Pesticide in Cow Milk Using Cd(II) Coordination Network with Sensitivity Up to 0.448 ppm

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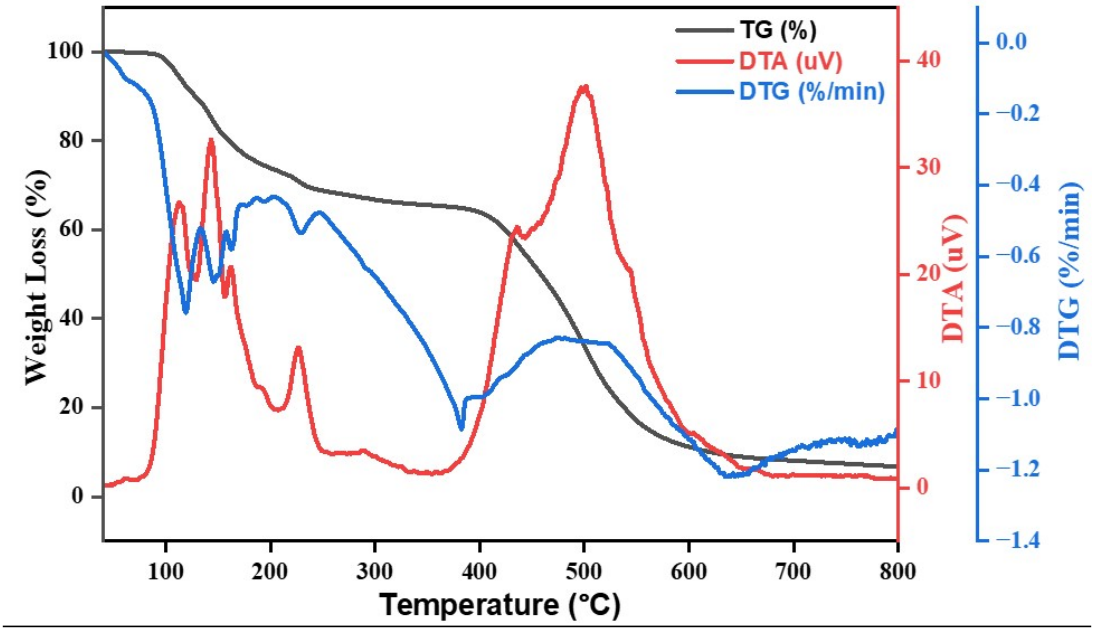

Fig.S1. Thermal Analysis of **[{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}]CP-1**

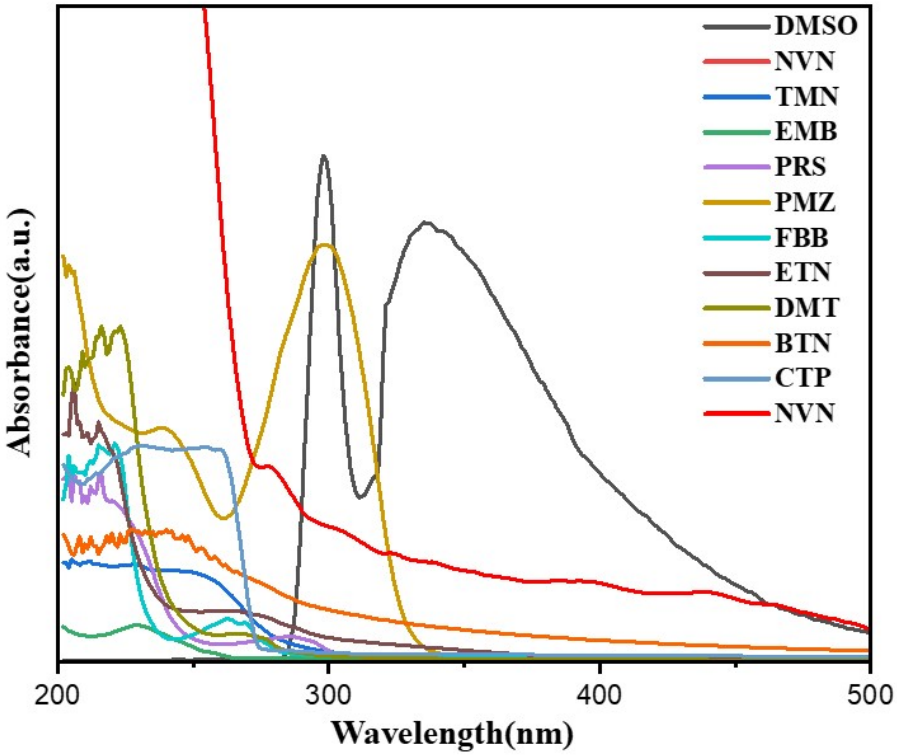

Fig S2. Spectral overlap between the UV-Vis absorption spectra of pesticides with the excitation spectra of **[{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}]CP-1**

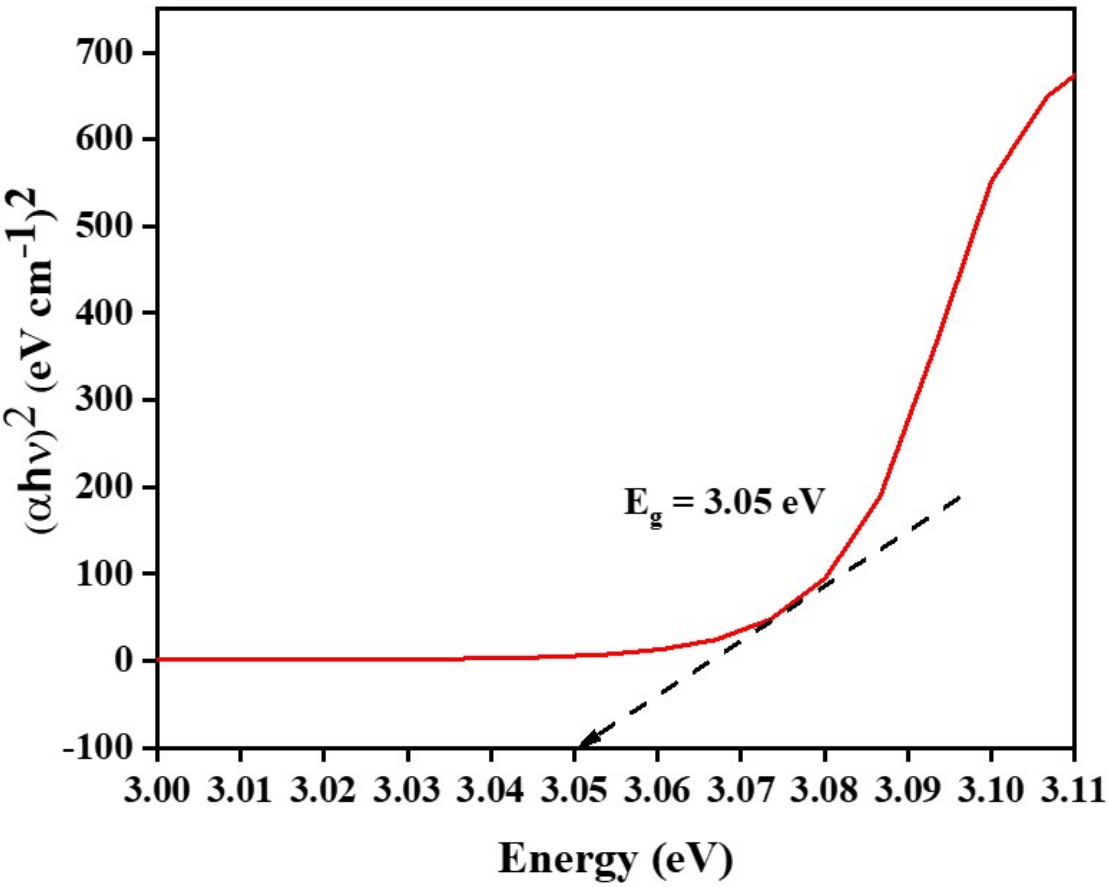

Fig.S3. Tauc Plot of **[{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}]CP-1**

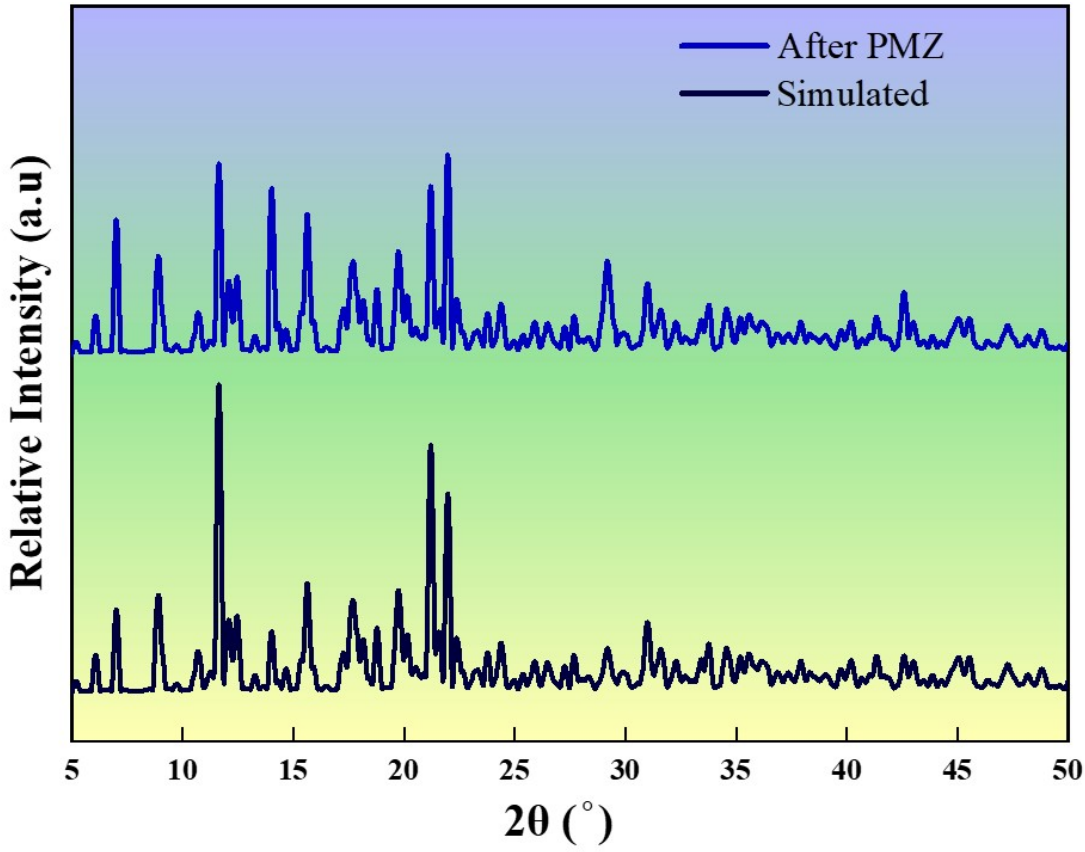

Fig.S4. PXRD pattern of **[{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}]**CP-1, simulated and after five cycle sensing of PMZ.

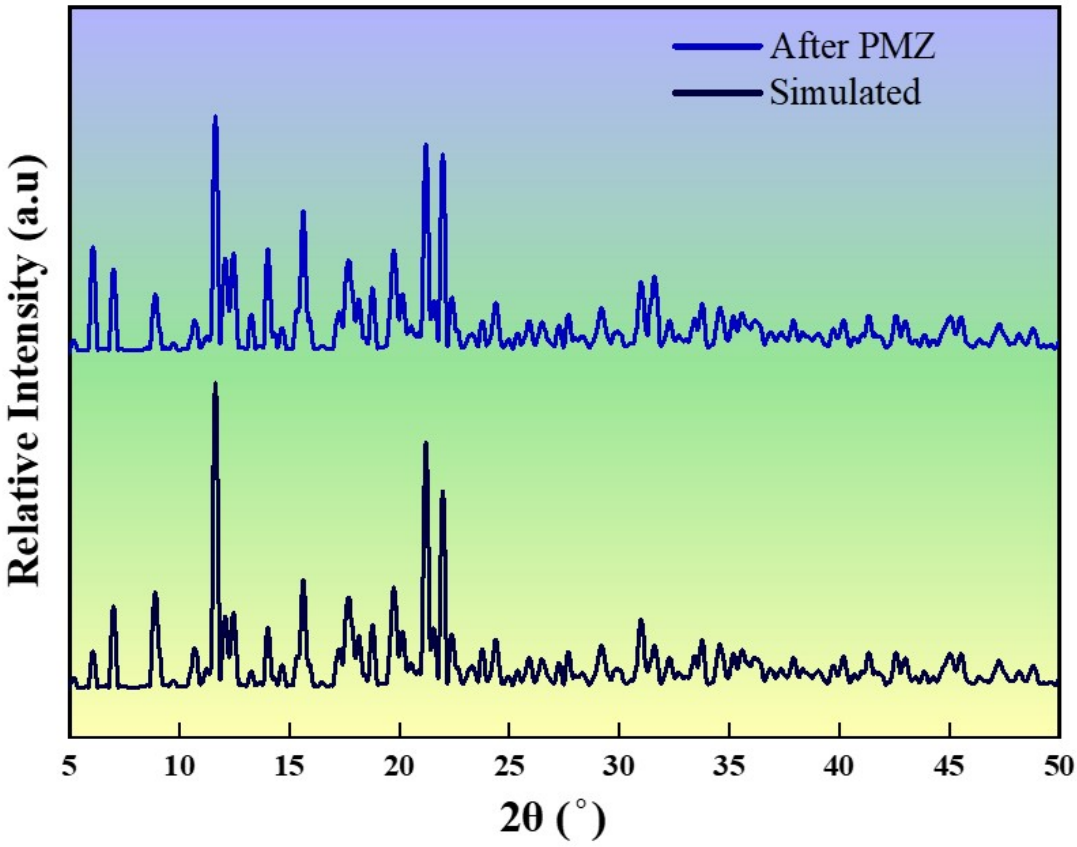

Fig.S5. PXRD pattern of **[{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}]**CP-1, simulated and after five cycle degradation of PMZ.

Table S1. Crystallographic information and structural refinement for **CP-1.**

Identification code	**[{Cd(Py)$_2$I$_2$}·{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}·{H$_2$O}].**
Empirical formula	$C_{44}H_{42}Cd_3I_3N_7O_8$
Formula weight	1514.81
Temperature/K	293(2)
Crystal system	monoclinic
Space group	C2/c
a/Å	35.0423(2)
b/Å	10.20760(10)
c/Å	29.9387(2)
α/°	90
β/°	103.5200(10)
γ/°	90
Volume/Å^3	10412.24(14)
Z	8
ρ_{calc}g/cm^3	1.9325
μ/mm^{-1}	24.144
F(000)	5793.6
Crystal size/mm^3	0.38 × 0.23 × 0.15
Radiation	Cu Kα (λ = 1.54184)
2Θ range for data collection/°	5.18 to 136.28
Index ranges	$-41 \leq h \leq 42$, $-11 \leq k \leq 12$, $-36 \leq l \leq 35$
Reflections collected	58087
Independent reflections	9446 [R_{int} = 0.1075, R_{sigma} = 0.0449]

Data/restraints/parameters	9446/0/591
Goodness-of-fit on F^2	1.041
Final R indexes [I>=2σ (I)]	R_1 = 0.0612, wR_2 = 0.1760
Final R indexes [all data]	R_1 = 0.0645, wR_2 = 0.1793
Largest diff. peak/hole / e $Å^{-3}$	2.40/-1.75
CCDC Number	2389050

Table S2. Bond Lengths of [{$Cd(Py)_2I_2$}{$Cd_2(Py)_5(BTC)(H_2O)I$}{H_2O}](CP-1).

Atom	**Bond Length**
Cd1 – O1	2.559(5)
Cd1 – O2	2.308(5)
Cd1 – O5	2.575(5)
Cd1 – O6	2.307(5)
Cd1 – O7	2.392(5)
Cd1 – N1	2.313(5)
Cd1 – N2	2.381(7)
Cd2 – O3	2.387(4)
Cd2 – O4	2.361(4)
Cd2 – N3	2.430(6)
Cd2 – N4	2.348(6)
Cd2 – N5	2.478(6)
Cd2 – I3	2.703(5)
Cd3 – I1	2.7038(7)
Cd3 – I2	2.6835(7)
Cd3 – N6	2.294(6)
Cd3 – N7	2.296(7)

Table S3. Bond Angles of [{Cd(Py)$_2$I$_2$}{Cd$_2$(Py)$_5$(BTC)(H$_2$O)I}{H$_2$O}](CP-1).

Atom1	Atom2	Atom3	Angle	Atom1	Atom2	Atom3	Angle
I1	**Cd3**	**I2**	130.22(3)	I3	**Cd2**	**O4**	168.3(1)
I1	**Cd3**	**N6**	103.7(2)	I3	**Cd2**	**N3**	95.5(1)
I1	**Cd3**	**N7**	106.4(2)	I3	**Cd2**	**N4**	103.0(1)
I2	**Cd3**	**N6**	108.0(2)	I3	**Cd2**	**N5**	97.2(1)
I2	**Cd3**	**N7**	108.4(2)	O3	**Cd2**	**O4**	55.2(2)
N6	**Cd3**	**N7**	94.2(2)	O3	**Cd2**	**N3**	85.6(2)
Cd3	**N6**	**C35**	121.4(6)	O3	**Cd2**	**N4**	143.9(2)
Cd3	**N6**	**C39**	120.5(6)	O3	**Cd2**	**N5**	87.8(2)
C35	**N6**	**C39**	117.7(8)	O4	**Cd2**	**N3**	84.6(2)
Cd3	**N7**	**C4ba**	121.7(6)	O4	**Cd2**	**N4**	88.7(2)
Cd3	**N7**	**C40**	120.0(6)	O4	**Cd2**	**N5**	82.6(2)
O1	**Cd1**	**O2**	52.9(2)	N3	**Cd2**	**N4**	89.7(2)
O1	**Cd1**	**O7**	87.9(2)	N3	**Cd2**	**N5**	167.2(2)
O1	**Cd1**	**N1**	88.1(2)	N4	**Cd2**	**N5**	89.1(2)
O1	**Cd1**	**N2**	89.9(2)	Cd1	**O1**	**C33**	87.3(4)
O1	**Cd1**	**O5**	171.6(2)	Cd1	**O2**	**C33**	97.8(4)
O1	**Cd1**	**O6**	135.8(2)	Cd2	**O3**	**C26**	90.4(4)
O2	**Cd1**	**O7**	87.7(2)	Cd2	**O4**	**C26**	91.5(4)
O2	**Cd1**	**N1**	141.0(2)	C34	**O5**	**Cd1**	87.6(4)
O2	**Cd1**	**N2**	90.9(2)	C34	**O6**	**Cd1**	98.3(4)
O2	**Cd1**	**O5**	135.1(2)	Cd1	**O7**	**Hj**	109(2)
O2	**Cd1**	**O6**	83.0(2)	Cd1	**O7**	**Hk**	109(2)
O7	**Cd1**	**N1**	90.4(2)	Cd1	**N1**	**C1**	122.5(5)

O7	**Cd1**	**N2**	177.8(2)	Cd1	**N1**	**C5**	120.6(7)
O7	**Cd1**	**O5**	90.0(2)	Cd1	**N2**	**C6**	123.6(6)
O7	**Cd1**	**O6**	87.8(2)	Cd1	**N2**	**C10**	119.3(6)
N1	**Cd1**	**N2**	89.6(2)	Cd2	**N3**	**C11**	122.8(6)
N1	**Cd1**	**O5**	83.8(2)	Cd2	**N3**	**C15**	120.8(6)
N1	**Cd1**	**O6**	135.9(2)	Cd2	**N4**	**C16**	121.2(4)
N2	**Cd1**	**O5**	92.2(2)	Cd2	**N4**	**C20**	121.2(5)
N2	**Cd1**	**O6**	93.7(2)	Cd2	**N5**	**C21**	122.2(5)
O5	**Cd1**	**O6**	52.2(2)	Cd2	**N5**	**C25**	120.1(5)
I3	**Cd2**	**O3**	113.0(1)				

Table S4. Comparison of Sensing ability of CP-1 with Previously Reported Methods

Analytical Method	**Detection Limit**	**Reference**
Fluorescence	86 ppm	[1]
Electrochemical	17 nM	[2]
Colorimetric	10 nM	[3]
Colorimetric	0.01mg/L.	[4]
Fluorescence	0.153 ppm	This Wok

Table S5. Comparison of Degradation Efficiency of CP-1 with Previously Reported Methods

Analytical Method	**Degradation (%)**	**Reference**
Ag_3PO_4/TpPa-1-COF	99.3	[1]

V-doped ZnFe LDH	73	[2]
CFNFe	90	[3]
CP-1	93.87	This Work

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