Syntheses, Structures and Photoluminescent Properties of Two New Pb(II) and Cd(II) Coordination Polymers Constructed from 1,10-Phenanthroline-derived and 1,4-Naphthalenedicarboxylate Ligands

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Two new related coordination polymers, namely, $[Pb(L)(1,4\text{-ndc})] \cdot 0.5H_2O$ (**1**) and $[Cd(L)(1,4\text{-ndc})] \cdot 0.5H_2O$ (**2**), where L = 2-(3-fluorophenyl)-1H-imidazo[4,5-f][1,10]phenanthroline and 1,4-ndc = 1,4-naphthalenedicarboxylate, were synthesized under hydrothermal conditions. Crystal data for **1**: $C_{62}H_{36}F_2N_8O_9Pb_2$, monoclinic space group $C2/c$, a = 15.874(3), b = 19.982(4), c = 16.045(3) Å, β = 94.26(3), V = 5075.3(18) Å^3, Z = 4. Crystal data for **2**: $C_{62}H_{36}Cd_2F_2N_8O_9$, monoclinic space group $P2_1/n$, a = 12.622(2), b = 14.038(3), c = 14.938(3) Å, β = 100.81(2), V = 2600.0(8) Å^3, Z = 2. In compound **1**, the 1,4-ndc ligands connect the Pb(II) atoms to yield a chain structure. The L ligands are attached on the same side of the chain. The π-π interactions between L ligands of neighboring chains result in a 2D supramolecular architecture of **1**. In compound **2**, 1,4-ndc ligands link the Cd(II) atoms to generate a layer structure. The L ligands from adjacent layers are paired to furnish strong π-π interactions. Further, these layers are extended into 3D supramolecular architectures through these π-π interactions. The structural differences of **1** and **2** suggest the importance of the metal centers in the construction of the coordination polymers. The luminescent properties of the compounds were also investigated.

Key words: Coordination Polymer, Crystal Structure, 2-(3-Fluorophenyl)-1H-imidazo[4,5-f][1,10]phenanthroline, 1,4-Naphthalenedicarboxylate