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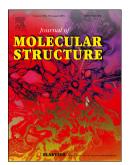
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Synthesis, Characterization, Crystal Structure Determination and Luminescence Study of New Linear Coordination Polymers Based on Mercury(II), Cadmium(II) and 4,7-Phenanthroline Ligand

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Abstract

Three novel coordination polymers containing Hg(II) and /or Cd(II) with 4,7-phenanthroline ligand (4,7-phen) have been synthesized and structurally characterized by single-crystal X-ray diffraction. Complexes $[Hg(\eta^2-4,7-phen)Br_2]_n$ (1), $[Hg(\eta^2-4,7-phen)I_2]_n$ (2) and $[Cd(\eta^2-4,7-phen)I_2]_n$ (3) were prepared from the reaction of one equivalent of 4,7-phenanthroline ligand with one equivalent of HgBr₂ (1), HgI₂ (2) and CdI₂ (3), in methanol, respectively. Suitable crystals of title compounds were obtained for X-ray diffraction measurement by methanol diffusion into a DMSO solution. All compounds have linear polymeric structures which extend parallel to the *c* axis and contain Hg(II) and Cd(II) centers coordinated by two bridging 4,7-phenanthroline ligands, and two coordinated halogen molecules, completing the Hg(II) and Cd(II) coordination spheres, and resulting in a distorted tetrahedral geometry. Furthermore, π - π (in 1-3) and M-1··· π (in 2 and 3) interactions play crucial role on stabilization of the crystal packing. The luminescence properties of the free ligand as well as the complexes 1-3 were investigated in solution. Thermal stabilities of these complexes were also studied by TGA/DTA analyses.

Keyword: Hg(II), Cd(II), 4,7-Phenanthroline, Coordination Polymer, Crystal Structure, Luminescence, TGA/DTA analyses.

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