

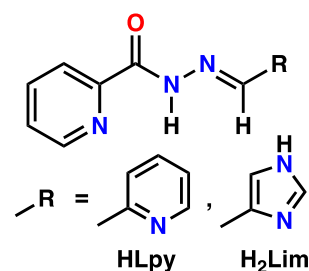
Mononuclear and Polynuclear Cobalt(II) or Cobalt(III) Complexes Bearing Multidentate Hydrazonato Ligands with Pyridyl and Imidazolyl Donor Groups: Synthesis, Crystal Structures and Properties.

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2-Picolinoylhydrazones having a *N*-heterocyclic (2-pyridyl or 4-imidazolyl) substituents (**Scheme 1**: HLpy or H₂Lim) are promising multidentate ligands, because their neutral and deprotonated forms (Lpy[−], HLim[−] and Lim^{2−}) have a variety of donor atoms and are possible to act as both multidentate chelating and bridging ligands. In this study, we have prepared a series of cobalt(II or III) complexes bearing such monoanionic ligands (Lpy[−] or HLim[−]), and their molecular and crystal structures were investigated.

Two types of mononuclear cobalt(III) complexes with Lpy[−], [Co(Lpy)₂]BF₄ and *mer*-[Co(Lpy)₃], were obtained by reactions of HLpy with Co(BF₄)₂•6H₂O and [Co(acac)₃], respectively, in an appropriate molar ratio. In these complexes, the ligand Lpy[−] coordinated to a Co^{III} center in a tridentate κ³N,N',N'' or a bidentate κ²N,N' mode. In addition, a trinuclear Co^{III}–Co^{II}–Co^{III} complex bridged by Lpy[−], [{Co(Lpy)₂}]₂Co(H₂O)₂(BF₄)₄ (**Fig. 1a**) was prepared. In the case of the imidazole-based ligand, HLim[−], both mononuclear and dinuclear Co^{III} complexes, [Co(HLim)₂]BF₄ and [Co₂(μ-HLim)₃](BF₄)₃ (**Fig. 1b**), respectively, were isolated and characterized.



Scheme 1 Hydrazones used in this research.

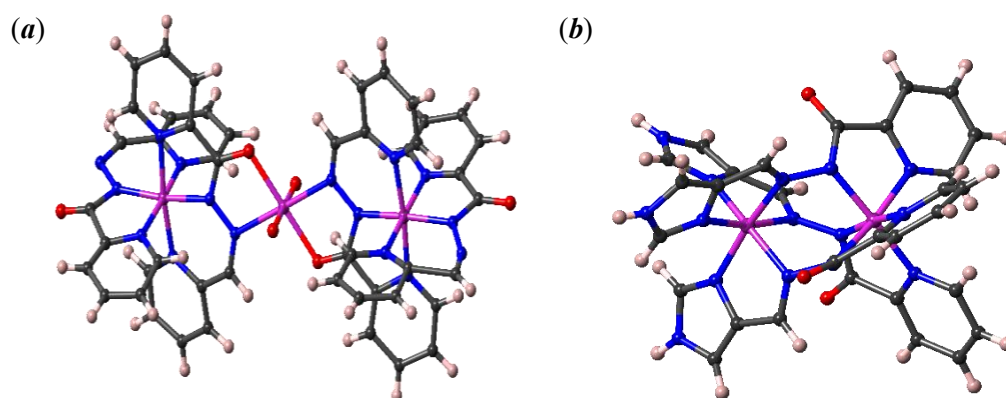


Fig. 1 Perspective views of (a) [Co(Lpy)₂Co(H₂O)₂]⁴⁺ and (b) [Co₂(μ-HLim)₃]³⁺ (color codes: Co, purple; O, red; N, blue; C, black; H, pale pink).