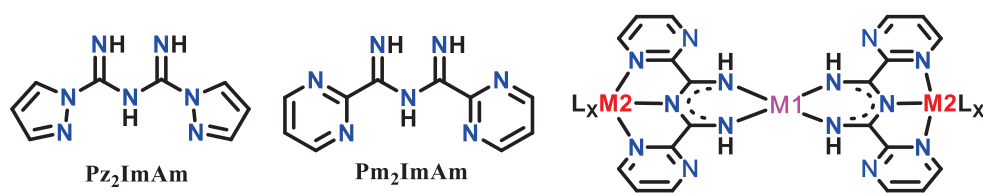


## Novel homo and heterometallic linear trinuclear complexes employing *N*-2-pyrimidylimidoyl-2-pyrimidylamidine ligands

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Nowadays, bidentate ligands such as acetylacetonate (**acac**) and 1,3-diketoiminate (**nacnac**), or tridentate ligands such as terpyridine (**terpy**), are often employed to isolate metallic complexes for a diverse range of applications including water splitting, organic catalysis, molecular magnets and photosensitizers to name a few. In that regard, the recently prepared *N*-2-pyrimidylimidoyl-2-pyrimidylamidine (**Pm<sub>2</sub>ImAm**) ligand<sup>[1]</sup> is an excellent candidate for the development of coordination complexes as it possesses a bidentate coordination site similar to **acac** and **nacnac**, yet also has a tridentate **terpy** like coordination site. Having these two types of coordination environments within the same complex provides avenues to explore metal complexes with different electronic configurations, for instance incorporating one metal in a low spin (LS) state while another metal is high spin (HS). Recently, Starikova<sup>[2]</sup> did a computational study that demonstrates the potential of linear trinuclear heterometallic complexes with *N*-1-pyrazolylimidoyl-1-pyrazolylamidine (**Pz<sub>2</sub>ImAm**) ligands to experience a two-step spin-crossover phenomenon. Inspired by her work, as a first step we synthesized similar linear trinuclear homometallic complexes with cobalt, nickel, and copper. These complexes have a central square planar metal ion (**M1**) coordinated in the bidentate pocket of **Pm<sub>2</sub>ImAm**, and two peripheral metal ions (**M2**) with either penta-coordinated or distorted octahedral configurations. As well, we have isolated heterometallic trinuclear complexes with a central square planar copper ion with two peripheral manganese dichloride groups. Structurally, the main difference between these complexes is the coordination geometry around the peripheral metal. Magnetic studies in these complexes are underway to access the electronic configuration of the metals and potential of the complexes as magnetic materials.



[1] M. Yousaf, N. J. Yutronkie, R. Castañeda, J. A. Klein, J. Brusso, *New J. Chem.* **2017**, *41*, 12218-12224.

[2] A. A. Starikova, *Chem. Pap.* **2018**, *72*, 821-828.