Research paper

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Supramolecular rectangles and ladders constructed from Ni(II), Cu(II) and Zn(II) mononuclear complexes with bicompartmental ligands and 4-aminopyridine as tectons

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Dedicated to Professor Ionel Haiduc on the occasion of his 80th anniversary

Abstract

By reacting [M^{II}(valpn)] or [M^{II}(valdmpn)] mononuclear complexes with 4-aminopyridine in different molar ratios, five [M^{II}(valXpn)(4-NH_2-py)] and one [Ni^{II}(valdmpn)(4-NH_2-py)$_2$] complexes were obtained and structurally characterized (M^{II} = Ni^{II}, Cu^{II}, Zn^{II}; valpnH_2 and valdmpnH_2 are the Schiff bases resulted from the condensation of *o*-vanillin with 1,3-propylenediamine and 2,2-dimethyl-1,3-propylenediamine respectively). In the [Cu(valpn)(4-NH_2-py)], [Ni(valpn)(4-NH_2-py)], [Zn(valpn)(4-NH_2-py)] and [Ni(valdmpn)(4-NH_2-py)] complexes the metal ions are pentacoordianated with a square pyramidal geometry. The specific hydrogen bond interactions of the amino group belonging to the 4-aminopyridine with the free $O_2O'_2$ compartment of the Schiff base ligands led to various supramolecular architectures: rectangles, chains, and ladders. The spectroscopic properties of the compounds were also investigated.

Keywords: hydrogen bonding, supramolecular rectangles, supramolecular ladders, bicompartmental ligands, 4-aminopyridine, photoluminescence

Introduction