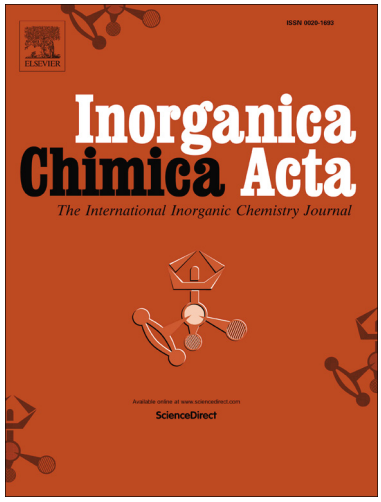

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Synthesis and characterization of unique new lithium, sodium and potassium coordination polymers

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Abstract

Five new alkali metal coordination compounds [Li(NPG)](1a), $[Na(NPG)_2]\cdot 2H_2O$(2a), $[C_8H_5KO_4]$(3a), $[Li(NPA)_2H_2O]$(1b) and $[Na(NPA)_2]$(2b) wherein (NPG=N-phthaloyl glycine, NPA= N-phthaloyl-ß-alanine) have been synthesized and characterized by means of X ray single crystal analysis, Infrared spectroscopy (IR), Thermogravimetric analysis (TGA) and Florescence spectroscopy. The compounds 1a, 2a, 3a and 2b showed metal directed self-assembly supramolecular network structures. The crystal structure of compounds 1a and 1b showed distorted tetrahedral geometry with coordination number 4 around lithium. The carboxylate coordination modes were $\eta^2\mu^3$and $\eta^1\mu^1$ in 1a and 1b respectively. The compounds 2a and 2b exhibited distorted octahedral geometry with coordination number 6 around sodium. The carboxylate coordination mode in 2a and 2b is $\eta^2\mu^2$. The objective was to synthesize potassium complex [K(NPG)], but N-phthaloyl glycine was hydrolysed due to exothermic reaction in the presence of strong base, resulted, the formation of 3a. The multiple coordination modes of alkali metal ions to the carboxylate and ring carbonyl oxygen atoms of NPG and NPA produced unique three dimensional architectures. The compounds 1b and 2b showed two strong fluorescence emissions enhancement (blue emission maxima) with greater intensity comparative to NPA, while the compounds 1a and 2a showed two weak fluorescence emissions with less intensity comparative to ligand (NPG). The base hydrolysis of NPG with in the compound 3a resulted the