Spectroscopic characterization of mixed cation disphosphates of the type $M^IFe^{III}P_2O_7$ (with M^I = Li, Na, K, Rb, Cs, Ag)

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The mixed cation diphosphates of composition $M^IFe^{III}P_2O_7$ have been prepared using the so called *co-precipitation method* starting with Fe(III) and M(I) nitrate solutions and solid $(NH_4)H_2PO_4$, and characterized by X-ray powder diffractometry. The infrared and Raman spectra of the compounds were recorded and the results are briefly discussed on the basis of their structural peculiarities. The ^{57}Fe-Mössbauer spectra show that the typical high-spin $Fe^{III}O_6$ octahedra existent in these compounds exhibit almost no distortion. However, the hyperfine parameters are sensitive to some characteristics of the M^I cations and to the different structural types.

Vibrational spectra of bis(maltolato)zinc(II), an interesting insulin mimetic agent

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Spectrochimica Acta 113A, 337-339 (2013).

The FTIR and FT-Raman spectra of the zinc(II) complex of 3-hydroxy-2-methyl-4-pyrone (maltol), bis(maltolato)zinc(II), were recorded and briefly discussed by comparison with the spectra of uncoordinated maltol and with some related maltolato complexes.

Investigation on the bioactivities of clioquinol and its bismuth(III) and platinum(II,IV) complexes

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Polyhedron 63, 28-35 (2013).

Complexes $[Bi(HCQ)_2(H_2O)Cl_3]$ (**1**), $[Pt(CQ)_2]\cdot 2KCl$ (**2**) and $[Pt(CQ)_2Cl_2]\cdot KCl$ (**3**) were obtained with 5-chloro-7-iodo-8-hydroxyquinoline, “clioquinol”, HCQ. Upon coordination to Bi(III) the antimicrobial activity improves. Complex **1** was 70-fold more active than fluconazole against *Candida albicans*. HCQ proved to be cytotoxic to HL-60 and jurkat human leukemia cells. Although coordination to Bi(III) did not result in significant modification of HCQ’s cytotoxic effect, on coordination to Pt(II, IV) cytotoxicity improved against both cell lines. Complexes **2** and **3** were more active than HCQ against HL-60 cells. Complex **2** also revealed to be the most cytotoxic compound against jurkat cells, being fivefold more active than *cisplatin*. Although HCQ and **1** did not show a pro-aptotic effect, **2** and **3** presented moderate pro-aptotic activity.

Bis(oxalato)dioxovanadate(V) and bis(oxalato)oxoperoxovanadate(V) complexes: Spectroscopic characterization and biological activity

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Biological Trace Elements Research 155, 295-300 (2013).

Two structurally related vanadium(V) complexes, $K_3[VO_2(C_2O_4)_2]\cdot 3H_2O$ and $K_3[VO(O_2)(C_2O_4)_2]\cdot 1/2H_2O$, were thoroughly characterized by infrared, Raman and electronic spectroscopies. The effect of both complexes on the viability of the human MG-63 osteosarcoma cells was tested using the MTT assay. The monoperoxo-complex shows a very strong antiproliferative activity (at 100 µM concentration this complex diminished the cell viability ca. 80%), whereas the dioxo-complex was inactive.

Spectroscopic characterization of an oxovanadium(IV) complex of oxodiacetic Acid and 2,2'-bipyridine. Bioactivity on osteoblast-like cells in culture

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The oxovanadium(IV) complex of oxodiacetic acid (H_2ODA) and 2,2'-bipyridine (bipy) of stoichiometry $[VO(ODA)(bipy)]\cdot H_2O$, was thoroughly characterized by infrared, Raman and electronic spectroscopies. The biological activity of the complex on the cell proliferation was tested on osteoblast-like cells (MC3T3E1 osteoblastic mouse calvaria-derived cells and UMR106 rat osteosarcoma-derived cells) in culture. The complex caused inhibition of cellular proliferation in both osteoblast-like cells in culture, but its action was statistically stronger in the tumoral cells. This effect was specially marked with increasing concentrations of the complex. Based on these preliminary biological results, $[VO(ODA)(bipy)]\cdot H_2O$ can be considered as a good candidate to be further investigated in relation to cancer treatment.

Synthesis and characterization of a zinc(II) complex of bispicen

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The synthesis of a Zn(II) complex of bispicen, the tetradentate ligand N,N'-bis(2-pyridylmethyl)-ethylenediamine, of composition $[Zn(bispicen)Cl(H_2O)]_2(ZnCl_4)$ is reported. Its crystal and molecular structure was determined by single-crystal X-ray diffraction methods. It crystallizes in the monoclinic space group *C2/c* with *Z* = 4 molecules per unit cell. The Zn(II) cation in the $[Zn(bispicen)Cl(H_2O)]^+$ complex is in a distorted octahedral environment, coordinated to a neutral bispicen molecule acting as a tetra-dentate ligand through its two amine nitrogen atoms, at *cis* positions with each other, and its two pyridyl N-atoms, at *trans* positions. The six-fold coordination is completed by a chloride ion and a water molecule. The tetrahedral $[ZnCl_4]^{2-}$ counter-ion lies on a crystallographic two-fold axis. The complex was further characterized by

FTIR spectroscopy, and its vibrational behavior compared with that of the dihydrated tetrahydrochloride of free bispicen.

Phytosiderophores and Related Systems: Metal Uptake by Plants

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