

refined by full-matrix least-squares method to an R value of 0.035.

The crystal structure consists of $[(en)(H_2O)_3 - Ni - pyr - Ni(H_2O)_3(en)]$ units and molecules of water. Pyromellitate ion behaves here as a bridging ligand with its two COO^- groups coordinated to the metal in *ortho* position. Remaining two COO^- groups are involved in hydrogen bonding. The metal atom is octahedrally coordinated by two nitrogen atoms belonging to ethylenediamine ligand, oxygen atom from coordinated COO^- group of pyromellitate ion and three molecules of water.

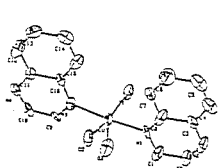
Complex molecules are inclined to the XY crystallographic plane at about 30° and are forming layers parallel to the XZ crystallographic plane. These layers are mutually connected by the system of hydrogen bonds.

09.4-24 THE STRUCTURE OF COMPLEXES OF Cu(II) AND Co(III) WITH TWO- AND THREEBASIC AMINOALCOHOLS. By T.I. Malinowsky, M.D. Mazus, Yu.A. Simonov, A.L. Kovalenko, V.N. Polyakov, The Institute of Applied Physics Academy of Sciences Moldavian SSR, Kishinev- 277028, USSR.

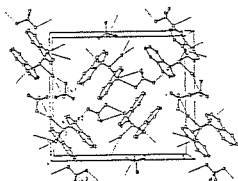
Various types of complexes are formed by aminoalcohols (AA) with transition metals by acting as both chelate and chelate-bridge ligands. The nature of the bonding of AA to metals depends on the metal-ligand ratio, the medium of synthesis and the extent of AA deprotonation. The structures of AA complexes with Cu(II) and Co(III) of the following composition: $[Cu(TRIS_2-H)H_2O]ClH_2O$ (I), $[Cu(TRIS-H)_2] \cdot 5H_2O$ (II), $[Cu(RDEA-H)Cl]_2$ (III), $K[Co(RDEA-H)_2] \cdot 7H_2O$ (IV), were determined by X-ray analysis methods. In compounds I-IV, AA is coordinated through the nitrogen atoms and oxygen atoms of alcohol. The participation of the latter in coordination is determined by the link with the metal of competing neutral- and acido- ligands. The framework of the structure is realized in I with ramification system of hydrogen bonds. The two chemically equivalent but crystallographically independent molecules in the crystal, form pseudodimers with the short $O-H \cdots O = 2.54 \text{ \AA}$ hydrogen bonds. The two AA molecules in the complex cation are in the *cis*-configuration; one of them is deprotonated, another - neutral. The dentation of the AA molecules is two and three respectively. The mononuclear structure with bidentate molecules of AA is realized in II. The centrosymmetric complex has a *trans*-configuration. The dimers where the distances $Cu-Cu = 2.952 \text{ \AA}$ form quadrimers through hydrogen bonds in III. The symmetry of the dimer is C_2 , the fragment Cu_2O_2 is not flat essentially. The coordination polyhedron of Co is a tetragonal pyramid with N-atom, two bridge-atoms, linked by C_2 -symmetry, and Cl-ion in the base. The O of the nonprotonated alcohol group is situated on the apex of the polyhedron. The magnetic properties of I-III are in fair agreement with the peculiarities of the complexes' structure. In IV the structure is realized with octahedral coordination of Co(III) formed by two mono-deprotonated molecules of AA.

09.4-23 CRYSTAL AND MOLECULAR STRUCTURE, MAGNETIC AND SPECTRAL PROPERTIES OF TRIAQUABIS(QUINOXALINE)COPPER(II) PERCHLORATE. By P.O. Lumme, S. Lindroos and E. Lindell, Department of Inorganic Chemistry, University of Helsinki, Vuorik. 20, SF-00100 Helsinki, Finland.

The crystal and molecular structure of triaquabis(quinoxaline)copper(II) perchlorate was determined by direct and Fourier methods. The compound crystallized in the monoclinic space group $P2_1/c$ with unit cell parameters $a = 8.263(2)$, $b = 17.259(7)$, $c = 15.307(5)$ Å, $\beta = 90.07(2)^\circ$, $Z = 4$. The molecular structure of the title compound consists of a cation $[Cu(C_{12}N_2H_6)_2(H_2O)_3]^{2+}$, where the copper atom is coordinated to two nitrogen atoms of the quinoxaline molecules and to three oxygen atoms of the water molecules. The coordination polyhedron around the copper atom is a trigonal bipyramid, the oxygen atoms forming the basal plane and the nitrogen atoms at the apical positions. The water molecules are involved in hydrogen bonding to perchlorate anions and to two uncoordinated nitrogen atoms of the quinoxaline ligands. The magnetic, infrared and reflectance spectral data are compared with those found for other copper quinoxaline complexes.



ORTEP drawing at 50% probability level for non-hydrogen atoms of the cation unit.



View of the unit cell down a.

	The Crystal Data							
	a(Å)	b(Å)	c(Å)	α (°)	β (°)	γ (°)	space group	R
I	19.785	11.798	6.489	90.13	96.39	91.81	P1	0.050
II	12.925	10.116	6.367	90	90	95.8	$P2_1/n$	0.051
III	19.459	18.202	13.251	90	90	67.21	$P2_1/a$	0.073
IV	15.488	14.812	7.632	90	90	86.34	$A2/a$	0.053