Unusual coordination modes of ligand 2-chloro-5-nitrobenzene sulfonate: synthesis, spectroscopic characterization, thermal and X-ray structural studies of metal 2-chloro-5-nitrobenzene sulfonate complexes, metal = Tl(I), Cu(II), Ag(I) and Pb(II).

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Streszczenie

Using metal ions thallium(I), copper(II), silver(I) and lead(II) and ligand 2-chloro-5-nitrobenzenesulfonate(cnb), four new metal complexes [Tl(cnb)]n(1), [Cu(en)2(H2O)2](cnb)2.2H2O(2), where en = ethylenediamine, [Ag(cnb)]n(3) and [Pb(cnb)2]n(4) have been synthesized and characterized by elemental analyses, spectroscopic methods (FT-IR, multinuclear NMR), single crystal X-ray structure analyses (except 4) and TGA analyses. Complexes 1 and 3 crystallize in monoclinic crystal system in P21/c space group having unit cell dimensions, a = 13.849(2) Å, b = 9.449(2) Å, c = 7.506(2)Å, β = 105.3°, V = 947.1 Å3, Z = 4 and a = 15.197(13)Å, b = 5.136(4)Å, c = 24.058(18)Å, β = 106.86°, V = 1797.1 Å3, Z = 4 respectively. Complex 2, crystallizes in triclinic crystal system with View the MathML sourcePI¯ having unit cell parameters; a = 6.888 Å, b = 7.835 Å, c = 13.227 Å, α = 80.20°, β = 83.15°, γ = 78.18°, V = 945.6 Å3, Z = 1. X-ray structure determination revealed that complexes 1 and 3 are polymeric in nature, whereas complex 2 has ionic structure. Remarkably, cnb ligand is coordinating through sulfonato oxygen atoms and nitro oxygen atoms in thallium complex but coordinates through sulfonato oxygen atoms and chloro group in silver complex, thereby showing the flexible/versatile coordinating behaviour of anionic ligand. This is unusual.

Słowa kluczowe

Non-coordinating anions, 2-chloro-5-nitrobenzene sulfonate, Polymeric sheets, Chelate rings

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