Structural Analysis of Powder Complex of Tris (1,10-phenanthroline)copper(II) Trifluoromethane Sulfonate Dihydrate

by CAHYORINI KUSUMAWARDANI1, LIS PERMANASARI1, SISKA DWI FATONAH1 and KRISTIAN HANDOYO SUGIYARTO1

ABSTRACT

The powder complex of tris(phenanthroline) copper(II) trifluoromethanesulfonate dihydrate has been synthesized by direct interaction of the corresponding precursors, copper(II) nitrate, phenanthroline, and potassium triflate. The metal content found to be 6.76% corresponds to the theoretical value of 6.77% in [Cu(phen)3](CF3SO3)2.2H2O. The equivalent electrical conductance producing the charge ratio of cation by anion to be 2: 1, should confirm the formula. The magnetic moment, μeff, of this complex which was to be 1.85-1.90 B.M, indicates that the complex is paramagnetic corresponding to spin-only value for one unpaired electron. UV-Vis spectrum of the complex reveals the only one broad absorption observed at about 681.50 nm (14673.51 cm-1), being associated with the spin allowed transition, 2Eg → 2T2g. The extinction coefficient of 48 Lmol1 cm-1 indicates the adoption of octahedral environment in this complex. The infrared spectrum shows absorptions of ligand group which is influenced by the metal-ligand interaction in this complex. The powder XRD of this complex was refined by Le Bail method of Rietica program and found to be fit as triclinic symmetry of space group P1.
Keywords: Rietica, Le Bail, Phenanthroline, Triflate, Copper(II).

Kata Kunci: *Rietica, Le Bail, Phenanthroline, Triflate, Copper(II).*