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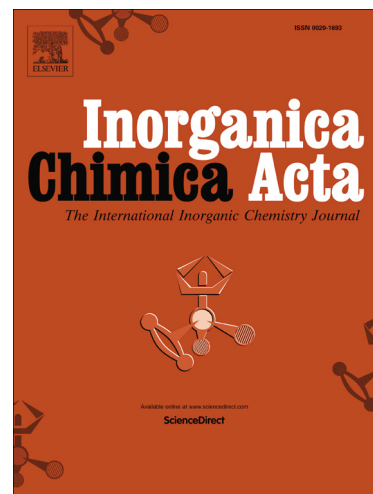
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Structure, spectra and electrical conductivity of Copper(I) and Silver(I) phosphino bridging mixed ligand complexes with Coumarinyl Schiff base

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ABSTRACT

Coordination polymers, $[-M(L)(\mu\text{-dppp/dppb/dpph})_n(X)_n]$, ($M = \text{Cu(I), Ag(I)}$; $L, N\text{-}\{(2\text{-pyridyl)methylidene}\}\text{-6-coumarin}$; $X = \text{NO}_3^-$ or ClO_4^- ; dppp, 1,3-bis(diphenylphosphino)propane; dppb, 1,4-bis(diphenylphosphino)butane; dpph, 1,6-bis(diphenylphosphino)hexane) have been spectroscopically characterised and one of the complexes, $[-\text{Ag(L)}(\mu\text{-dpph})_n(\text{NO}_3)_n]$ has been structurally supported by single crystal X-ray diffraction measurement. The current(I)-voltage(V) characteristics of the coordination polymer lies in the semiconductor range ($\sim 10^{-3} \text{ Sm}^{-1}$) and non-ohmic in nature; the band gap lies below 3.0 eV. The complexes are emissive in the visible region (509 – 522 nm) and solid phase emission is more intensive than solution phase. The cyclic voltammetry shows Cu(II)/Cu(I) couple at 0.8 – 0.9 V and ligand reductions at -0.59 to -0.69 V and -0.92 to -1.38 V. The spectral and conducting properties have been explained by DFT computation of molecular functions using optimised structures.

Keywords: Coumarinyl Schiff's base, Cu(I) and Ag(I) coordination polymer, X-ray structure, fluorescence, electrical conductivity

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