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Metal- metal interaction and properties of some novel, covalently linked transition metal complexes with tetraazamacrcocyclic ligand

Straightforward synthetic routes have been developed for homobimetallic donor-acceptor complexes by means of the nucleophilic substitution reactions of M^{II} (5, 7-Me_2 [14]4, 7-dieono (-1) $N_4)^+$ complex (where M = Ni^{II}, Cu^{II}, Co^{II}, Co^{III}) with α, α′ –dibromo-o-xylene in 2:1 ratio. These systems contain o-xylene linked, face-to-face macrocyclic ligand complexes bridged by halide ions and can serve as simple models for fundamental studies of hole-transfer. The complexes were characterized by their elemental analysis, FAB mass spectroscopy, HNMR spectroscopy, electronic spectra and electrochemical of some of these complexes. Metal-metal interaction inferred by donor-acceptor coupling of homo-bimetallic systems was evaluated by means of UV-Visible spectroscopic measurements. Electrochemical potentials (shown in the table below) ans/0r magnetic susceptibility measurements. The face-to-face macrocyclic homo bimetallic complexes show a surprising affinity for halide bridged homobimetallic complexes are the first simple molecular models of inner sphere electron transfer system (donor/acceptor systems) in which the transition metal donor and acceptor σ-orbitals are mixed by ligand σ-orbitals.

Complex	E^1 ½, V	E^2 ½, V	ΛE ½, V
$[Lcu_2Cl]^{3+}$	0.915	0.94	0.025
$[LNi_2Cl]^{3+}$	0.668	1.268	0.6
$[LCo_2Cl]^{3+}$	0.268	0.684	0.42