Silver(I) Complexes with the 1,1'-Bis(diethyldithiocarbamate)ferrocene Ligand. Polymeric Chain Species

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The reaction of $Fc(S_2CNEt_2)_2$ (Fc = $Fe(\eta^5\text{-}C_5H_4)_2$) with $[Ag(OTf)(PPh_3)]$ (OTf = trifluoromethanesulfonate) or $[Au(OClO_3)(PPh_3)]$ in various molar ratios gives complexes of stoichiometry $[Ag(PPh_3)\{Fc(S_2CNEt_2)_2\}]OTf$, $[Ag(PPh_3)_2\{Fc(S_2CNEt_2)_2\}]OTf$, $[Ag_2(PPh_3)_2\{Fc(S_2CNEt_2)_2\}](ClO_4)_2$ or $[Ag_3(PPh_3)_3\{Fc(S_2CNEt_2)_2\}](ClO_4)_3$. Treatment of $Fc(S_2CNEt_2)_2$ with Ag(OTf) gives the complex $[Ag(OTf)\{Fc(S_2CNEt_2)_2\}]$, which can easily react with bidentate ligands such as 1,10-phenanthroline (phen), bis(diphenylthiophosphoryl)methane ($(SPPh_2)_2CH_2$) or NaS_2CNEt_2 to afford the cationic complexes $[Ag(phen)\{Fc(S_2CNEt_2)_2\}]OTf$, $[Ag\{(SPPh_2)_2CH_2\}\{Fc(S_2CNEt_2)_2\}]OTf$ or the neutral $[Ag(S_2CNEt_2)\{Fc(S_2CNEt_2)_2\}]$. The crystal structure of $[Ag(PPh_3)_2\{Fc(S_2CNEt_2)_2\}]OTf$ reveals that silver coordinates to the dithiocarbamate sulfur atoms of two ferrocene ligands, thus forming a chain polymer.

Key words: Silver Complexes, Ferrocene, Dithiocarbamates, Polymeric Chain