Vapochromism in Complexes of Stoichiometry $[Au_2Ag_2R_4L_2]_n$

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Dedicated to Professor Hubert Schmidbaur on the occasion of his 75th birthday

Reaction of $[NBu_4][Au(C_6X_5)_2]$ (C_6X_5 = 3,5-$C_6Cl_2F_3$, C_6Cl_5) with $AgOClO_3$ in an Et_2O/CH_2Cl_2 mixture affords $[Au_2Ag_2(C_6X_5)_4(OEt_2)_2]_n$ [C_6X_5 = 3,5-$C_6Cl_2F_3$ (**1a**), C_6Cl_5 (**1b**)]. These compounds react with tetrahydrofuran, acetone, acetonitrile or toluene in solution and in the gas phase (with toluene only in solution) to the new complexes $[Au_2Ag_2(C_6X_5)_4L_2]_n$ [L = THF (**2a**, **2b**), $(CH_3)_2CO$ (**3a**, **3b**), CH_3CN (**4a**, **4b**), C_7H_8 (**5a**, **5b**)]. The crystal structures of **2a** and **5a** have been determined by X-ray diffraction methods, showing polymeric chains formed by the union of tetranuclear Au_2Ag_2 units *via* aurophilic interactions. The thermal stability and the vapochromic behaviour of these complexes have been studied by thermogravimetric analysis (TGA), X-ray powder diffraction and FT-IR spectroscopy.

Key words: Gold, Silver, Luminescence, Vapochromism