Macrocyclic Gold(I) Complexes with Bridging Diacetylide and Diphosphine Ligands

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Dedicated to Professor Hubert Schmidbaur, the undisputed champion of gold chemistry, on the occasion of his 70th birthday

The new dialkynyldigold(I) complexes $[Ar(OCH_2C{\equiv}CAu)_2]_n$ {Ar = 1,4-$C_6H_4(CMe_2$-4-$C_6H_4)_2$, 4,4'-$C_6H_4C_6H_4$ and 1,5-$C_{10}H_6$} react with diphosphines LL = $Ph_2P(CH_2)_nPPh_2$ (n = 1 to 6) and *trans*-$Ph_2PCH{=}CHPPh_2$ to give luminescent macrocyclic digold(I) or tetragold(I) complexes with bridging diphosphine and diacetylide ligands. The digold(I) complex [1,4-$C_6H_4(CMe_2$-4-$C_6H_4OCH_2C{\equiv}CAu)_2(\mu$-LL)], with LL = *trans*-$Ph_2PCH{=}CHPPh_2$, forms a 28-membered ring, and the rings associate through aurophilic bonding in the solid state. In contrast, the tetragold(I) complex [4,4'-$C_6H_4C_6H_4(OCH_2C{\equiv}CAu)_2(\mu$-LL)], with LL = $Ph_2PCH_2PPh_2$, forms a more rigid 42-membered ring.

Key words: Gold, Macrocycle, Diacetylide, Diphosphine, Luminescence