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Phosphine-aryldiethynyls (–C≡C(Ar)C≡C–)-gold(I)-gold(III) complexes: Synthesis and spectral study

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$[Au_2(dppm/dppe/dppa)(Cl)_2]$, which on reaction with aryldiethynyls, -C≡C(Ar)C≡C-, and gold(I) phosphines in MeOH, CH_2Cl_2 medium, by the self assembly technique leads to $[(PPh_3)Au(1,4\text{-}B)Au(PPh_3/PPh\text{-}oMe/PPh_2Me/PPhMe_2/PCy_3/PNEt_2/PNMe_2/AsPh_3/DAPTA)]$, (**1a-1j**, **2**), $[\{Au_2(dppm/dppe/dppa)\}\{(1,4B)Au(PPh_3/PPh\text{-}oMe/PPh_2Me/PPhMe_2/PCy_3/PNEt_2/PNMe_2/AsPh_3)\}_2]$, (**3**, **6**, **7**, **8**, **9**, **10**, **11**), $[\{Au_4(dppm/dppe/dppa)_2(1,4B)_2\}]$, **4**, $[(AuPPh_3)_2Au^{III}(14B)(Mes/C_6F_5)_2]$, **5a**, **5b** [dppm/dppe/dppa = diphenyl phosphino-methane(*a*), -ethane(*b*), ammine(*c*), C_6F_5/Mes pentafluorophenyl/mesitylene, 14B = arylethynyl benzene, DAPTA=diacetyl 1,3,5-triaza-7-phosphaadamantane]. The maximum molecular peak of the corresponding molecule is observed in the ESI mass spectrum. IR spectra of the complexes show -C=C- , -C=N-, as well as phosphine, mesitylene and pentafluorophenyl stretching. The ^{1}H NMR spectra as well as ^{31}P (^{1}H)NMR suggest solution stereochemistry, proton movement and phosphorus proton interaction. ^{13}C (H)NMR spectrum reflects the molecular skeleton. In the ^{1}H-^{1}H COSY spectrum of the present complexes assign the solution structure. Complex 2 is water soluble and the spectra measured in D_2O.

Keywords: Gold(I), Gold(III), 14B, NMR, ESI-MS, IR