Self-assembly of gold(I) alkynyl phosphine: impact on the photophysical pathways

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Gold(I) complexes exhibit interesting emissive properties that usually are modulated by the presence of aurophilic (Au···Au) interactions.[1-4] These interactions are a consequence of the strong relativistic effects displayed by gold atoms and their energy can range from 29-46 kJ/mol\textsuperscript{[5]} which is comparable to that of strong hydrogen bonds.[6] We demonstrated for a series of dinuclear \[(diphos)((4-pyridiyl)ethynyl gold(I))]\textsuperscript{2} complexes that the occurrence of aurophilic interactions in the solids produced and enhancement of the radiative rate constant and emission quantum yield due to the favoured intersystem crossing to the ground state, promoted by the approaching of the gold(I) atoms and the subsequent increasing of the spin-orbit-coupling.

Our recent results on the formation of hydrogels from small organometallic complexes containing Au(I)-alkynyl moieties,[7-9] prompted us to go one step further in the design and synthesis of supramolecular nanostructures constituted by self-assembly of small molecules, where the supramolecular packing is modulated by Au···Au interactions. The aim of the present work is to analyze the effect of the Au···Au interactions on the photophysical properties of these supramolecular nanostructures, through the use of femtosecond time resolved spectroscopy.

References

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