

# LUMINESCENT TETRANUCLEAR Au<sup>I</sup>-Cu<sup>I</sup> TRIPHOSPHINE CLUSTERS: PHOTOPHYSICAL PROPERTIES RESPONSE THE NATURE OF ALKYNYL LIGANDS

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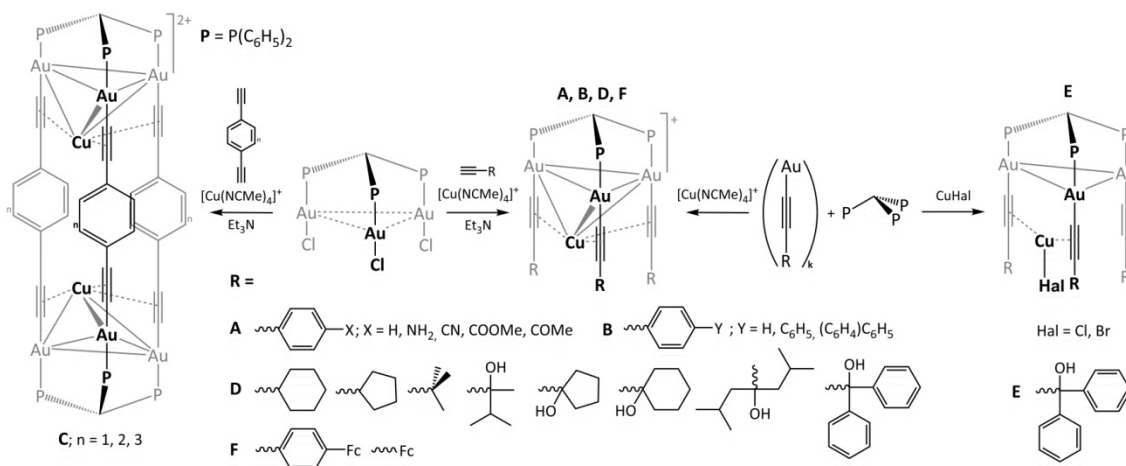
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Herein we report a novel family of the tetranuclear Au<sup>I</sup>-Cu<sup>I</sup> alkynyl clusters stabilized by the tridentate phosphine ligand. All of the novel compounds contain common structural motif described as [(PAuC<sub>2</sub>)<sub>3</sub>Cu]. Several series of the complexes with a different type of the alkynyl ligands were obtained. Photophysical properties of the structurally similar Au<sup>I</sup>-Cu<sup>I</sup> complexes functionalized different alkynes have been systematically investigated. It has been found that the luminescence properties of all complexes depend dramatically on alkyne ligands nature:

- Compounds **A** were revealed a substantial red shift of the emission maxima with the increase in the electron donicity of the alkynyl ligands substituents.[1]
- Compounds **B** and **C** display dual singlet and triplet luminescence, the former component of which can be completely suppressed in concentrated solution by self-absorption phenomenon.[2]
- Compounds **D** and **E** were found to show luminescence vapochromism for detection of acetone, methanol and tetrahydrofuran.
- Compounds **F** demonstrate no luminescence.

The theoretical calculations showed that variations of the substituents at the alkynyl ligands display very little effect on cluster core structural parameters but show appreciable influence onto the orbital energies and the luminescent properties of the compounds under study.



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[1] J.R. Shakirova, E.V. Grachova, V.V. Gurzhiy, I.O. Koshevoy, A.S. Melnikov, O.V. Sizova, S.P. Tunik and A. Laguna, *Dalton Trans.* 2012, 41, 2941. [2] J.R. Shakirova, E.V. Grachova, A.A. Melekhova, D.V. Krupenya, V.V. Gurzhiy, A.J. Karttunen, I.O. Koshevoy, A.S. Melnikov, and S.P. Tunik, *Eur. J. Inorg. Chem.*, accepted.