

Title: **Highly Luminescent Gold(I) Supramolecular Systems**

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This work is divided in two parts. On the one hand, the main objective is the synthesis of a gold(I) complex through a three-step synthesis. First, the synthesis of phosphane-coumarin is carried out. Subsequently, the gold(I) polymer is synthesized. Finally, both products obtained in the other two steps react to form the gold(I) complex.

This work is innovative, since a different gold(I) complex structure is proposed, compared with previous data reported in the literature. In this new structure, the chromophore group (in our case an hydroxycoumarin) is coordinated through the phosphane to the metal atom and not through the alkynyl group, as was performed previously in the research group.

All products obtained in each step of the gold(I) complex synthesis have been characterized by spectroscopic techniques such as ^1H NMR, ^{31}P NMR, IR and ESI-MS.

On the other hand, given the situation (COVID-19), most of this work has been based on bibliographical research. Therefore, we have focused on analyze what was in the literature about phosphane-coumarins that could help us in a future experimental task. That is why new ligands have been investigated in which a phosphane (either cyclical or linear) is linked to a substituted coumarin. The search was also extended to other ligands in which a phosphane is linked to other chromophores with coumarin-like properties, such as naphthalene or pyrene.

Once all this information was obtained, the structures were compared according to the different chromophore groups. The different synthetic methods were also compared, taking into consideration the conditions used such as temperature, reflux time, the base used, the solvent, etc. Finally, the photophysical properties and final applications of the phosphane-chromophore compounds were discussed.