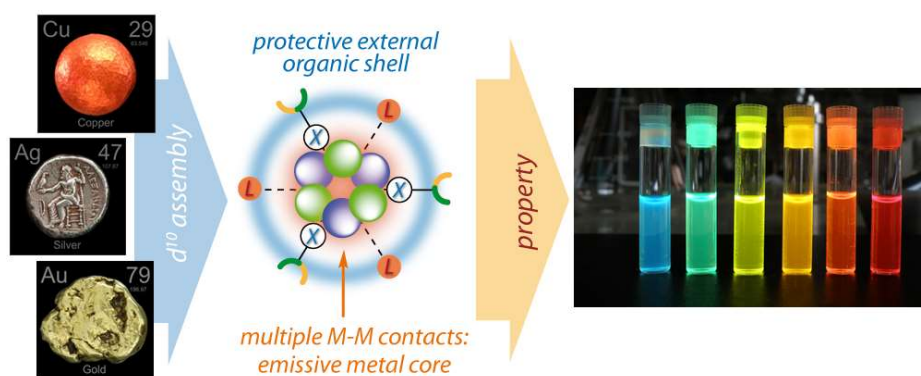


Polynuclear coinage metal complexes: the impact of ligands on the assembly and luminescence

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The chemistry of coinage metals (copper, silver and gold) has been in the focus of intense research and showed a remarkable development particularly since the 90-s of the previous century. The organization principles of the corresponding coordination compounds (stable oxidation states, typical coordination numbers, preferable ligands) seemed to be simple and obvious to the moment when the phenomenon of aurophilicity was described, later generalized to metallophilicity. With respect to d^{10} closed shell configuration, metallophilicity has become a well-recognized non-covalent interaction, which promotes formation of a wide range of supramolecular structures with diverse physical functionalities.¹ Mostly they are manifested by photoluminescence behaviour, which can provide a pathway to molecular sensors, responsive materials, light-emitting devices, labels for bioimaging.²

There is no doubt that accurate design of ligand environment is necessary for effective construction of coinage metal aggregates and tuning their photophysical characteristics. While soft X-type bridging ligands, such as halides, chalcogenides, thiolates, aryls, alkynyls, tend to produce coordination polymeric species, the templating L-type ligands (phosphines, carbenes) are used to prevent polymerization and allow to generate discrete molecular compounds. The composition and molecular architecture of these aggregates are therefore regulated by many factors, e.g. stereochemical properties and flexibility of organic spacer in oligodentate template ligands, the nature of the bridging X groups and of d^{10} M(I) ions etc.



This presentation briefly outlines the results of our work in the field of luminescent complexes from the viewpoint of joint influence and the interplay of some phosphine and anionic ligands on the preparation and the photophysical properties of di-/polynuclear aggregates of copper-subgroup metals.

1. Mirzadeh, N.; Privér, S. H.; Blake, A. J.; Schmidbaur, H.; Bhargava, S. K., *Chem. Rev.* **2020**, *120*, 7551-7591.
2. Yam, V. W.-W.; Au, V. K.-M.; Leung, S. Y.-L., *Chem. Rev.* **2015**, *115*, 7589-7728.