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Advances in the development of new luminescent supramolecular assemblies from polyaromatic ligands

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In this work we have designed and synthesized new luminescent functional coordination compounds based on anthracene and pyrene derivatives. Firstly, we have designed anthracene linkers by using tunable approaches that allowed us to obtain anthracene ligands with different functional coordination groups and consequently with different optical properties. By self-assembly approaches, we have obtained panoply of various luminescent coordination compounds based on Zn^{2+}, Cd^{2+}, Cu^{2+}, Ag^{+}, Ni^{2+}, Pd^{2+}, In^{3+} and lanthanide Eu^{3+}. In this thesis, you will find the syntheses of new anthracene molecules and their use for obtaining 0D coordination compounds and 1D, 2D and 3D coordination polymers (CPs) that were analyzed by crystallography. Obtained new luminescent compounds were studied and characterized spectroscopically including time-resolved spectroscopy, photoluminescence and quantum yields. Some of the results that were obtained with new luminescent coordination polymers show a large perspective for application in sensing for detection of pesticides and nitro explosives in the ppb range. Furthermore, a new luminescent Ni-based metal organic framework that was obtained shows a unique uptake of fullerenes C_{60} and C_{70} from the solution during self-assembly, it demonstrates interesting polarized emission that was harvested from the crystals of such nano-functionalized MOF.

In addition, synthesized new pyrene molecules show high photostability that was studied. The results demonstrate a large perspective for application of such molecules in the cells staining and bioimaging of different biological objects. Results were obtained *in vivo* and *in vitro* proving excellent photochemical properties of these new pyrene derivatives.

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