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Synthesis of 4-amino-N-4-pyridin-1,8-naphthalimide, a new ligand for complexes and metalorganic frameworks

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Naphthalic imides are usually fluorescent molecules, obtained by the reaction of 1,8-naphthalene anhydrides and primary amines. This class of compounds is interesting due to a series of chemical and physical properties such as chemical and thermal stability, well defined and scaleable (by aromatic rings functionalization) spectroscopy and electrochemical properties as they are also electron acceptors, allowing them to mediate electron transfer processes. These molecules are generally solvatochromic and photoactive towards photoinduced eletron transfer, and they may be used in optical sensors. Due to this property, they behave like n-type semiconductors in solid state, allowing the construction of electronic devices like transistors and OLEDs too. They undergo reversible redox reactions at modest potential forming stable radical anions easily identified by (EPR). Bidentate naphthalimides, as 4-amino-N-4-pyridin-1,8-naphthalimide are also regarded as bridging ligands to prepare "Metal-organic Frameworks" (MOFs) whose properties and structure can be modulated by changing its substituents. 4-amino-N-4-pyridin-1,8-naphthalimide was synthesized for the first time, by the reaction between 4-nitro-1,8-naphthalic anhydride and 4-aminopyridine on ethanol reflux. The imide reduced on a stannous chloride acidic solution and purified by the recrystallization on methanol. High fluorescence was observed in organic solutions. Its structure was elucidated by NMR. Emission and absorption spectra were studied in different solvents and at several pHs, in aqueous solutions. We have noticed decreasing intensities of fluorescence spectra as well as a small bathochromic shift, as the polarity of solvent increases. Changing medium´s acidity, (pH range between 2.04 and 5.60) it was possible to indentify two pKa values (2.75 and 3.49) as predicted by theoretical calculations, using absorption data. We could also observe what seems to be an hypochromic shift as the pH increases, but this has to be confirmed by other measurements such as quantum yield, and excited-state lifetime.

Biography

Ulisses Fiorin Angelo completed his chemistry degree from the University of São Paulo, his Masters degree, and currently, he is on course of the last period of his Doctoral studies in Molecular Materials and Interfaces Laboratory (MMIL) *(http://sites.usp.br/lmim/)* at the same University. He is a member of the Editorial Board of "CADERNOS CIMEAC", a periodic specialized in popular education.

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