

\*Proceedings\*

# Applications and Properties by Using Time-Resolved Fluorescence and Transient Absorption Spectroscopy

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**Abstract:** In this presentation, the absorption (transient absorption) and emission (steady state and time-resolved fluorescence) spectroscopy will be used to study, investigate and characterize the mechanisms of fluorescence quenching and obtaining new sensors for to detect toxic environments: heavy metals from water. For this purpose, new compounds were synthesized for to have a good fluorescence (high quantum yield), stability and selective sensibility. The study of fluorescence quenching by different metal ions such: Ni<sup>2+</sup>, Cu<sup>2+</sup>, Co<sup>2+</sup>, Zn<sup>2+</sup>, Fe<sup>3+</sup>, Mn<sup>2+</sup>, Ca<sup>2+</sup>, Pb<sup>2+</sup>, Cr<sup>3+</sup>, Cd<sup>2+</sup>, Sr<sup>2+</sup>, Mg<sup>2+</sup> will be study in solution, film at different temperature and variation in time for to demonstrate that these samples have a good stability and can be used as fluorescence sensors for the selective detection of metal ions. For fundamental study, theory of dynamic quenching, theory of static quenching and combined dynamic and static quenching were used, and the constants of the process, the lifetime in excited state, the quantum yield, the non-radiative and radiative rate constants were estimated. The lifetime, around 0.0001 s for each metal complexes was calculated by the analysis of the decays with and without oxygen. The emission from singlet oxygen was observed at 1275 nm in all samples, and the lifetime and quantum yield are dependent on the substitution on metal ions. Also, new application of the compounds investigated for detection of toxic environments (heavy metals- Fe) was obtain, sensor for to detect Fe from water.

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