

Nowadays, technologies involving organic materials are increasing with many examples, such as smartwatches, displays in tablets, notebooks, TVs, smart windows, and others. Most of them are based on organic lighting emitting diodes (OLED) technologies associated with the use of small organic molecules in the emissive layer in these devices. Optoelectronic devices based on organic materials do not need a backlight and have good mechanical processability. There are many ways to obtain light from organic matter with different emission properties. Currently, the most promising materials are those exhibiting the Thermally Activated Delayed Fluorescence (TADF) process, which allows obtaining 100% theoretical efficiency. In this way, the search for new molecules that can present TADF properties increases to achieve the best performance in organic lighting emitting diodes. For that, the molecular design needs to attend to essential parameters to cover the TADF functionality.

For our proposal, the acceptors and donors were chosen carefully to cover the TADF properties. Conjugated quinoxalines were chosen as acceptors due to well-known luminescent and electronic conduction properties, and bis-diphenylamine and bis-acridine derivatives were chosen as donor parts that can aggregate different colours emission. In this way, our proposal is directly related to the design and synthesis of new conjugated macrocycles with TADF properties to be investigated for dual application for organic electronic devices. The research proposal will significantly contribute to increasing the knowledge of organic electronics and help develop the next generation of organic materials for display applications. Devices with better efficiency will help decrease the global consumption of energy and contribute to the future of the lighting market.