Title: **Synthesis of functionalized porphyrin for organo- and photoredox catalysis.**
Student: Hector Bernaus Vives
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Supervisor/s: Dr. Albert Moyano Baldoire
Departament of Química Inorgànica I Orgànica

SUMMARY

Modern organic chemistry is always looking for finding new and sustainable ways to form new C-C bonds. Photoredox catalysis seems to be a reasonable option, but gives problems in synthesis of asymmetric chiral compounds. This problem, can be resolved in dual catalysis (which involves a combination of photoredox and organocatalysis in the same media) and also remove the use of organic solvents and allows the reuse the aqueous media once the process takes place, too. So, this project is about to propose two synthetic routes to synthetize (4-piperidyl)-10,15,20-tris-(4-phenyl) phorphyrin(**1**). (**1**) is the product of interest because it's a phorpyrin that contains a secondary amine, which means that it can act as bifunctional photoredox catalyst . According to that, every synthetic route of this project can be divided in different parts. In the first synthetic route the first part is about to obtain *N*- Boc-4-formylpiperidine (**2**) from commercially available isonipecotic acid (**3**). The second, part is about to synthetize the corresponding *N*-protected phorpyrin (**4**) with a condensation from (**4**), benzaldehyde and pyrrole and an oxidation. Then part three, is about removing Boc through a deprotection reaction. In the second synthesis, first step is also about to synthetize an aldehyde (**9**) using (**3**) as starting product, but, the protector group is Cbz instead of Boc. Then a condensation between 4-(Hydroxymethyl) piperidine-1-carboxylate (**9**), benzaldehyde and pyrrole takes place followed by an oxidation. Finally, an hydrogenation in order to remove the protector group Cbz, takes place.

Keywords: Porphyrin, bifunctional, organocatalysis, photoredoxcatalysis, synthesis.