SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
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Department

Design of synthetic methods

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Licentiateship in Chemistry
PhD in Organic Chemistry
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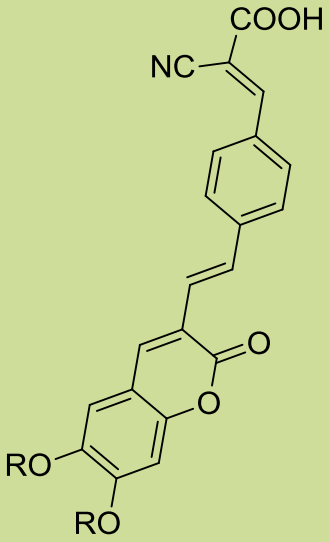
Research Interests: Organic synthesis and catalysis; development of new synthetic methods

Objectives

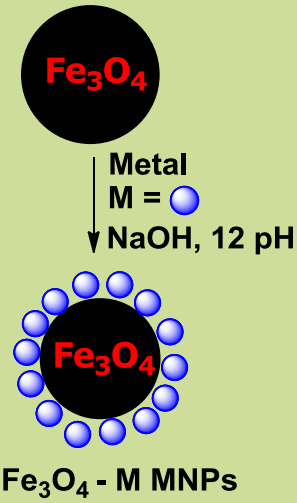
Development of new styryl coumarin chromophores with potential applicability in DSSC or optical memory devices. Coumarins are molecules that can be easily tune to incorporate substituents that allow to increase the conjugation at the 3- or 5-position

Development of a variety of catalysts involving metal supported Ferrite-NPs and applications in synthetic organic reactions.



Methodology

- The extension of the coumarin π-electron system to 3- or 5-styryl coumarins was achieved by Heck palladium coupling reactions on vinyl coumarin substrates. The photochemical and photophysical proprieties of the synthesized compounds will be studied and corroborated by computational studies.
- Magnetite is an ideal oxide support, easy to prepare, having a very active surface for adsorptions or immobilization of metals and ligands, which can be separated by magnetic decantation after the reaction, thus making it a more sustainable catalyst. The nanomaterial will be prepared by the simple precipitation method and anchoring of the homogeneous organic catalyst or metal will be pursued in aqueous media. The catalytic activity will be tested in important organic reactions.



Expected Results

- The pronounced modification of the electronic structure of 3- and 5-styryl coumarins resulted in the alteration of the absorption and emission properties of the chromophore also corroborated by computational studies. Furthermore, conjugated 5-styryl undergo E-Z isomerization with significant quantum yields. We anticipate that this behavior could be explored for the usage of these compounds in optical memory devices.
- Impregnated magnetite-supported metals (Pd, Ni, Co, Ce, Ru, Mo) or magnetite-supported organocatalysts are recoverable catalysts applied in important reactions-reduction, oxidations, multicomponent reaction and coupling reactions.

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