



LIGHT-DRIVEN REGIOSELECTIVE [2+2] CYCLOADDITION OF ARYL-ENONES BY EOSIN Y

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The use of light as energy source for organic synthesis has been emerged as a powerful tool to both explore new reactivity and have environmentally friendly processes.¹ In the same way, the development of flow chemistry in combination with light-driven processes allows to enhance the efficiency and the scalability of the reaction.² In this context, photocyclization of aryl-enones promoted by visible light in the presence of photocatalysts provides an innovative strategy for the synthesis of cycloalkanes, through radical intermediates.³ After exploiting reactivity of different substituted aryl-enones to effort the [2+2] photocycloaddition by the use of Eosin Y as photocatalyst using visible light irradiation, we decided to transport this reaction under flow conditions in order to have a more efficient process.

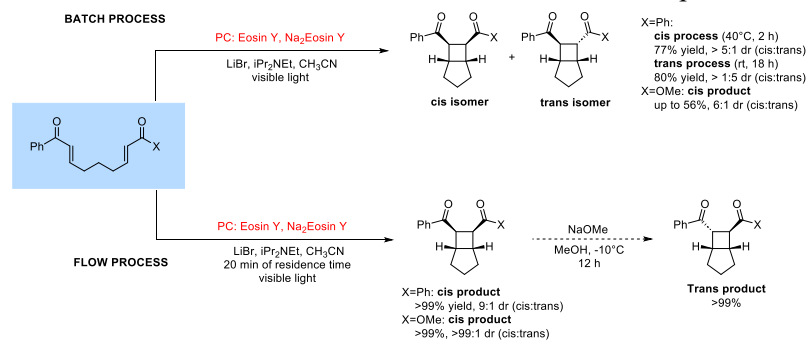


Figure 1: [2+2] photocycloaddition of aryl-enones in batch and in flow.

Different reaction conditions have been tested using symmetric and asymmetric substrates to achieve the bicycle products in good yields as a mixture of isomers. With our delight, for the symmetric aryl-enone, it was possible to find the conditions to selectively drive the cycloaddition towards one or the other isomer. Also, the best reaction conditions have been used in flow leading to reduced reaction time, increased productivity and selectivity towards the *cis* isomer preferentially, both for symmetric and asymmetric substrates. The *cis* isomer can be quantitatively converted into the *trans* isomer under basic conditions.

References:

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