Water-Soluble, Organic Photocatalysts with Powerful Electrochemical and Photophysical Properties

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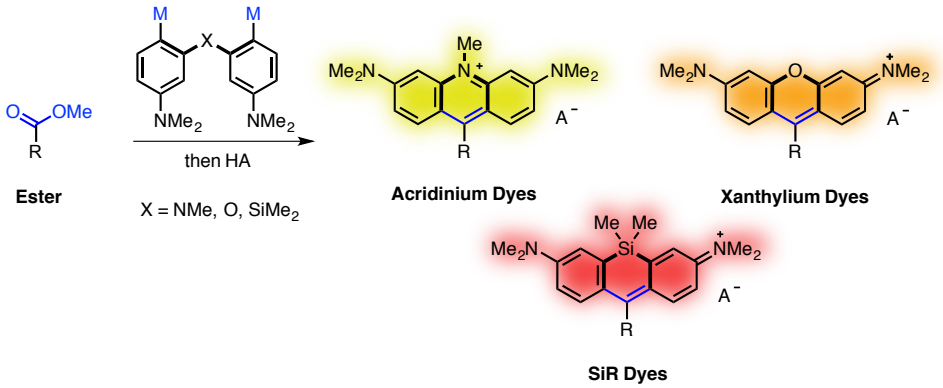
Small-molecule organic fluorophores are indispensable in material science, biological imaging and chemical synthesis. In order to cover the increasing demand for dyes with specific photophysical, chemical and electrochemical properties, synthetic approaches typically rely on the versatility of heterocyclic ring assembly. However, due to the incompatibility of the required reagents and conditions, established approaches frequently suffer from limitations in functional group tolerance needed for fine-tuning dye properties.

Hence, we envisioned that a double addition of 1,5-bifunctional organomagnesium reagents, such as 1,5-dimetallic dianilide, to a carboxylic acid ester would lead to the formation of a heterocyclohexadienolate intermediate which dehydrates upon acidic work-up to provide dyes with distinct heterocyclic cores and favorable photophysical properties within a single step.[1]



By scrutinizing our strategy further, we discovered various unprecedented water-soluble organic fluorophores with powerful electrochemical and photophysical properties, capable of replacing expensive transition-metal based photocatalysts and allowing pure organophotocatalysis.[2-5]

[1] C. Fischer, C. Sparr *Angew. Chem. Int. Ed.* **2018**, *57*, 2436–2440.
[2] C. Fischer, C. Sparr *Tetrahedron* **2018**, *doi: 10.1016/j.tet.2018.04.060*.
[3] C. Fischer, C. Sparr *Synlett* **2018**, *doi: 10.1055/s-0037-1610233*.
[4] C. Fischer, C. Sparr *EP 17/188,288 patent filed*.
[5] C. Fischer, C. Sparr *Manuscript in preparation*.