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Photocatalytic strategies for the synthesis of *C*-nucleoside analogues

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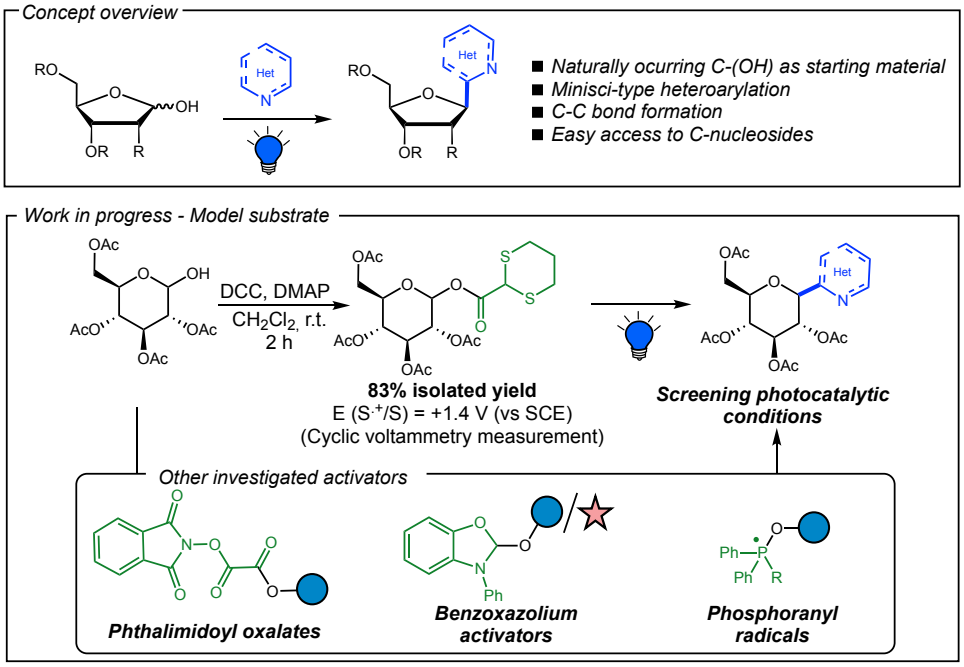
ABSTRACT

Nucleosides and nucleotides are biological molecules involved in critical processes like genetic information storage and transmission. Many nucleoside analogues are important bioactive compounds used in medicine and agroindustry.[(1,2)] *C*-nucleosides hold significant potential for developing new molecules and studying biological processes. However, their synthesis is usually time-consuming, involving multiple derivatization steps.[(3)] Therefore, new methods to directly functionalize naturally-occurring C-(OH) bonds in glycosides are highly sought, and photocatalysis emerges as a powerful paradigm-changing tool for synthetic carbohydrate chemistry.



Scheme 1: General concept overview and work progress.

In this work, we explore photocatalytic strategies for deoxygenative arylation of C-O bonds in glycosides, aiming to efficiently synthesize valuable *C*-nucleoside analogues *via* Minisci-type substitution. Voltammetry studies of dithiane-activated glucose revealed an intriguing irreversible oxidation at +1.4V. Despite testing several photocatalysts, none have proven effective in promoting this oxidation thus far. As we evaluate stronger oxidants, we are also testing other promising C-O photo-activators with glucose and ribose derivatives, envisioning their carbon-centered anomeric radicals.

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