

PHOTOREDOX CATALYZED SYNTHESIS OF INDOLE-BASED AZAHELICENES

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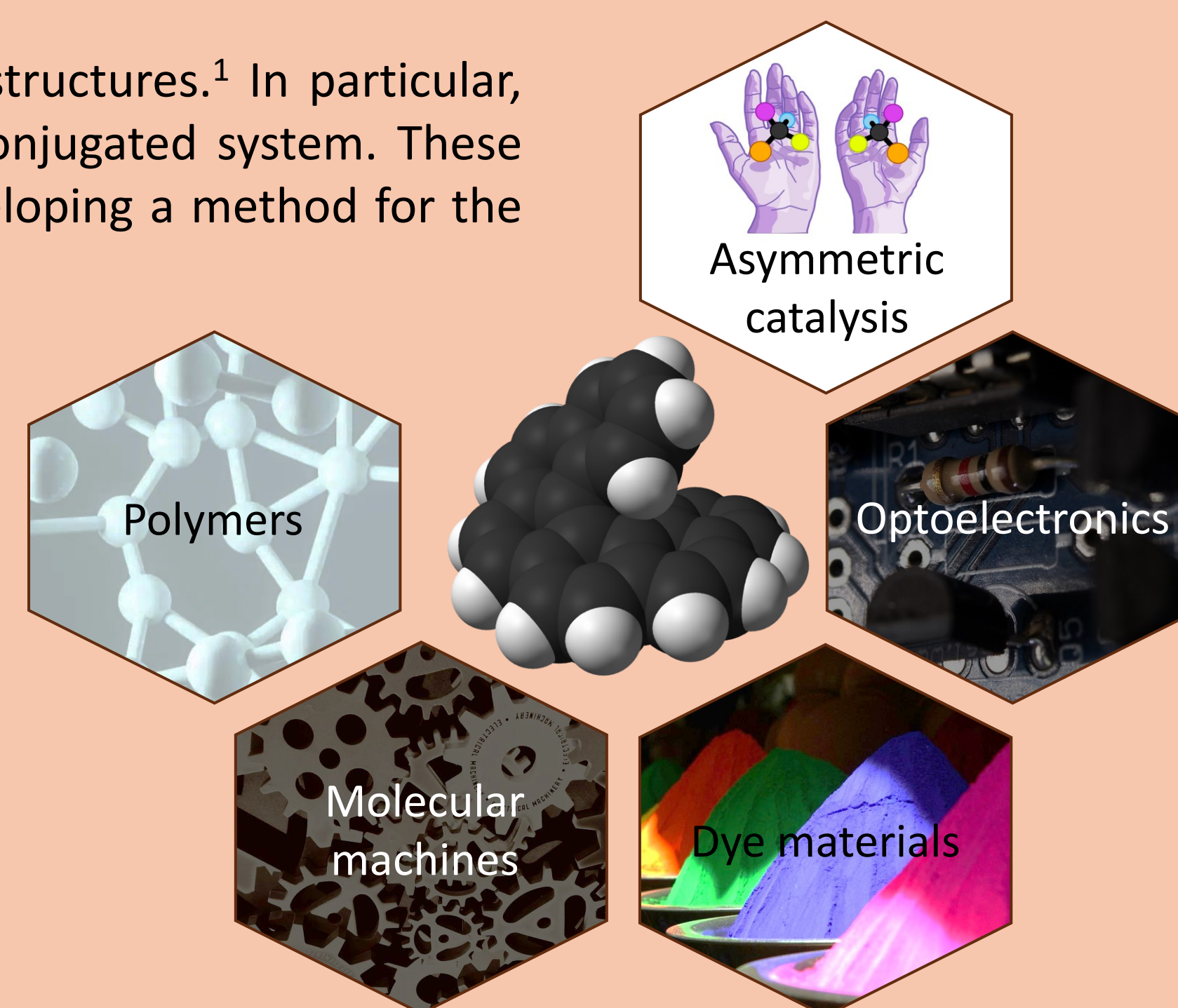
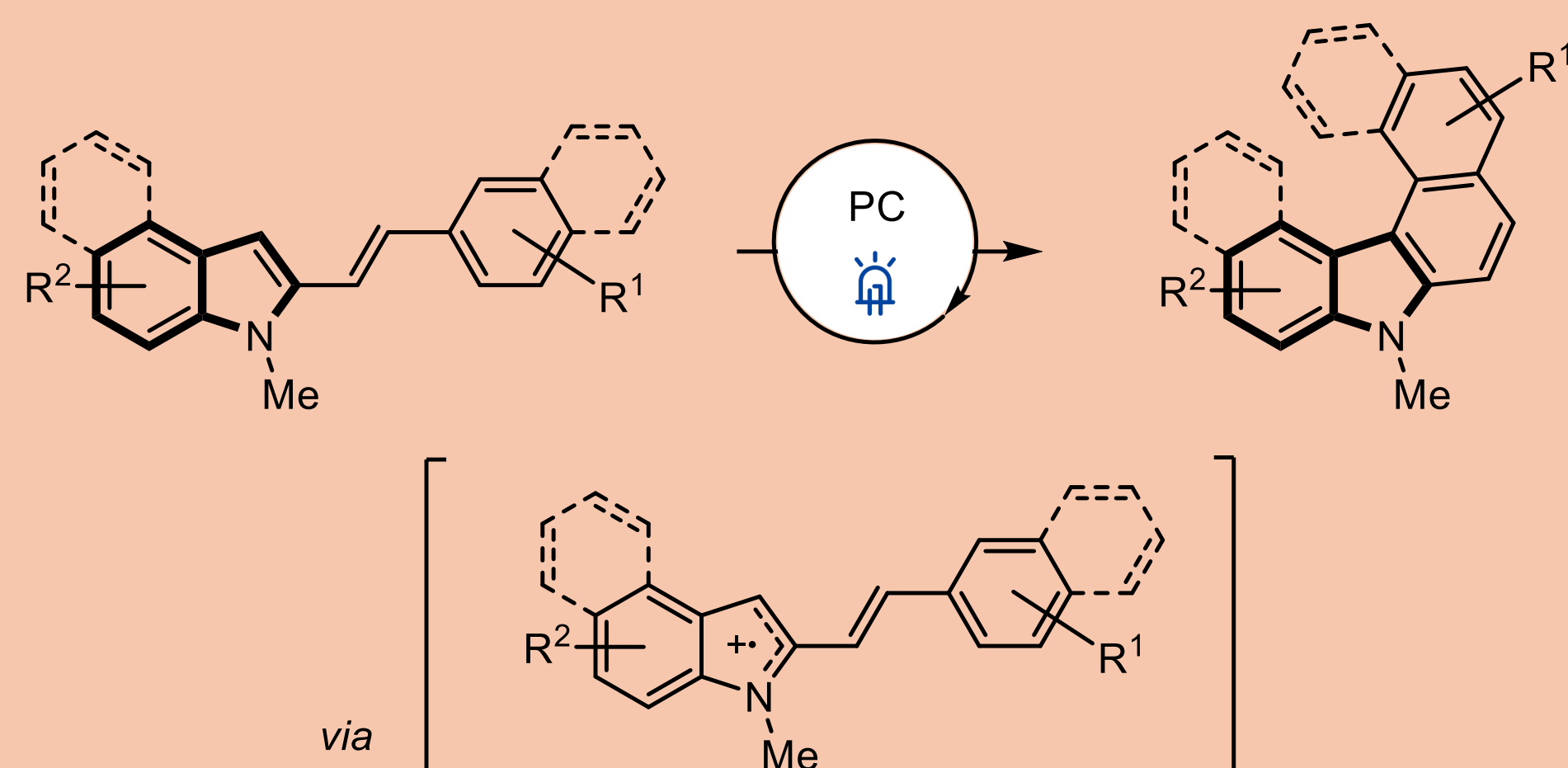
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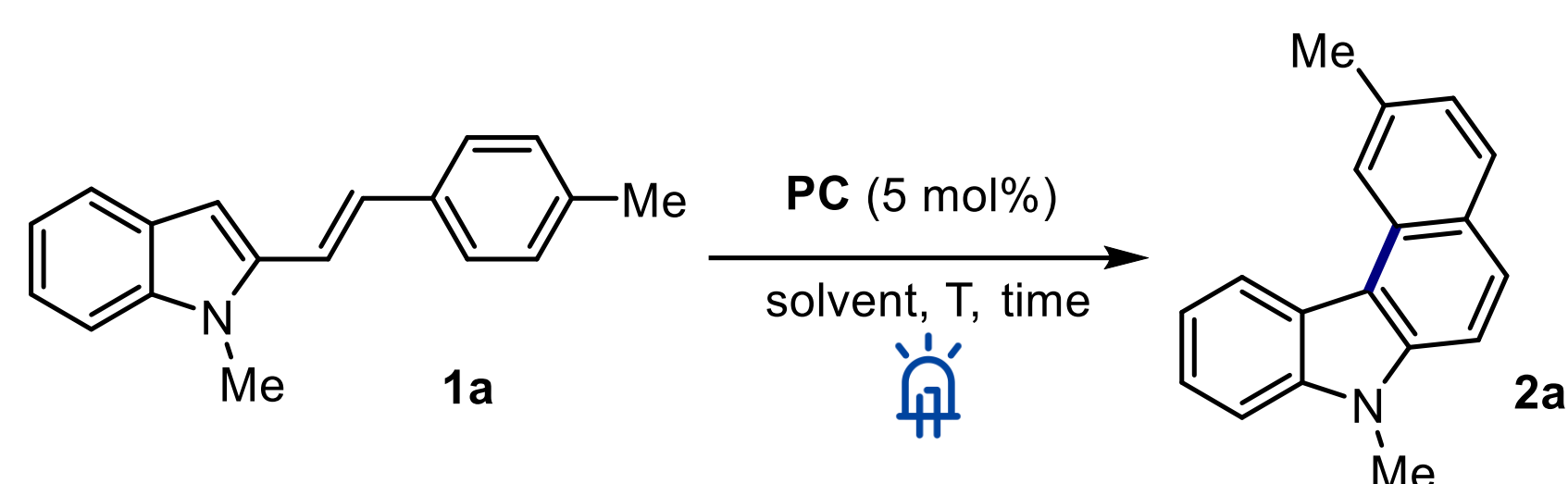
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Introduction

In recent years, **photoredox catalysis** has spread as an essential tool for the synthesis of heterocyclic structures.¹ In particular, azahelicenes constitute a class of heteroaromatic molecules which are characterized by an extended conjugated system. These compounds find application in many field due to their large conductivity and polarizability.² We are developing a method for the preparation of different **benzo[c]carbazoles** and **indole-based azahelicenes** under photoredox conditions.



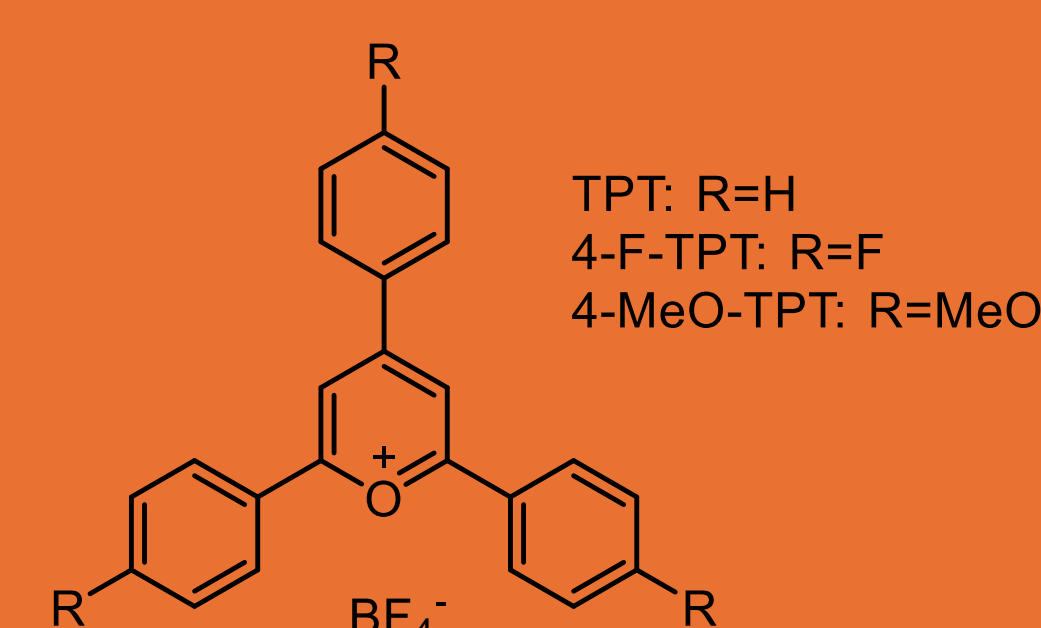
Screening of the reaction conditions



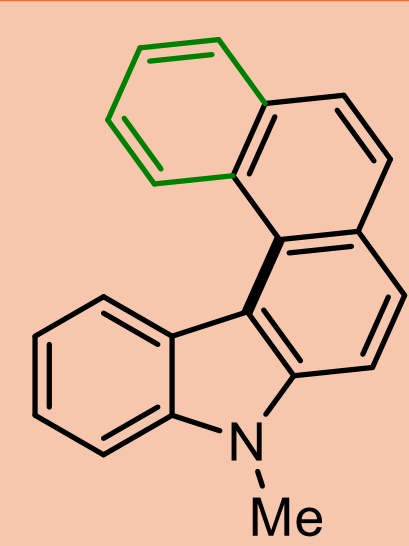
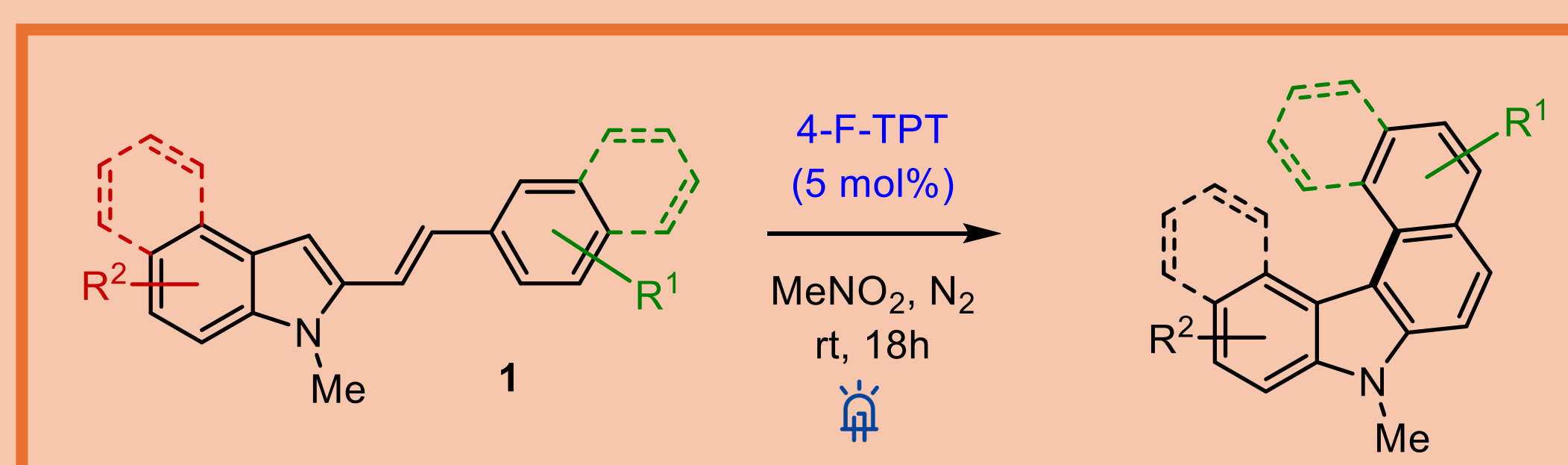
Reaction conditions: **1a** (0.2 mmol), photocatalyst (5 mol%), solvent (2 ml, 0.1 M) at rt for 18 h under 40 W blue led irradiation ($\lambda_{max} = 440$ nm).

Entry	Catalyst (mol%)	Solvent	Yield (%)
1	TPT	CH ₃ NO ₂ /HFIP 10:1 (0.1 M)	44
2	TPT	DCE	20
3	TPT	CH ₃ CN	14
4	TPT	CH ₃ NO ₂	63
5	4-F-TPT	CH ₃ NO ₂	68
6	4-OMe-TPT	CH ₃ NO ₂	30

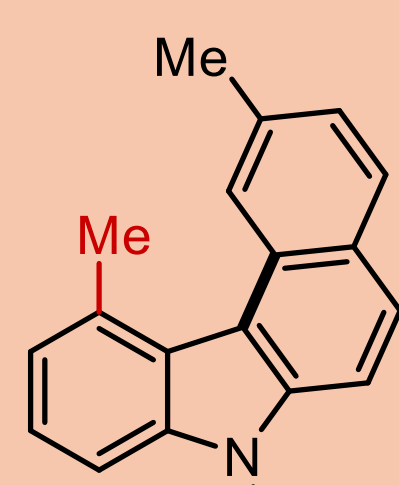
Tested photocatalysts:



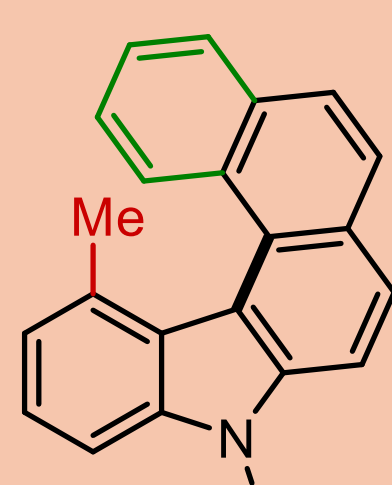
Scope of the reaction



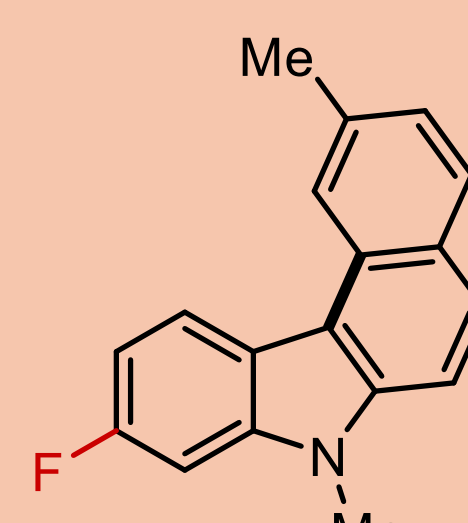
2g 71%



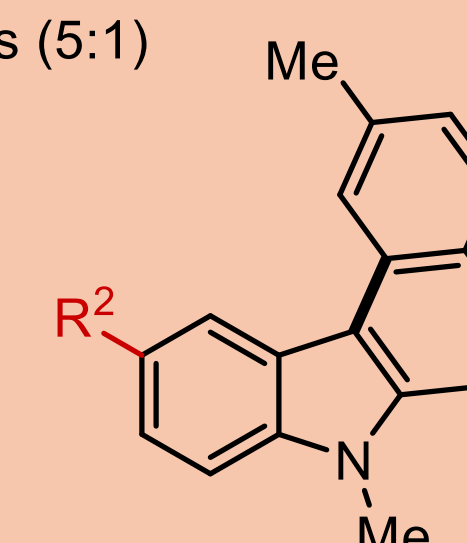
2h 44%



2i 54%

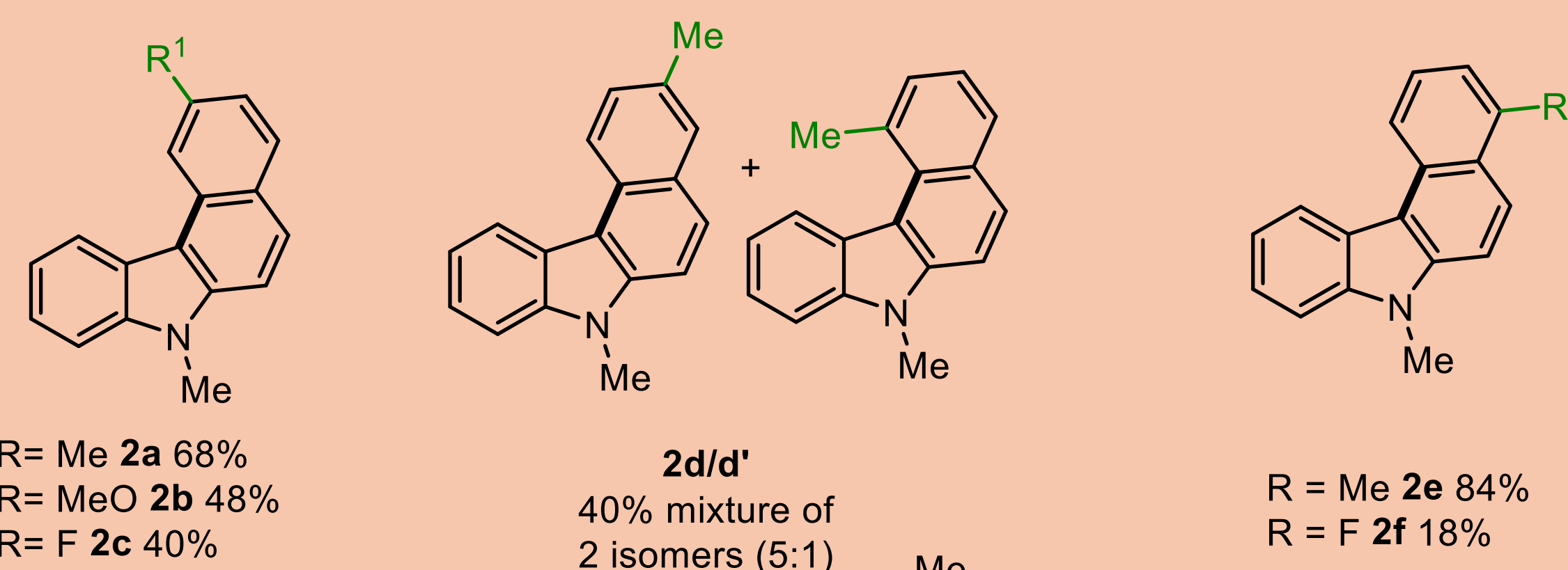


2j 57%

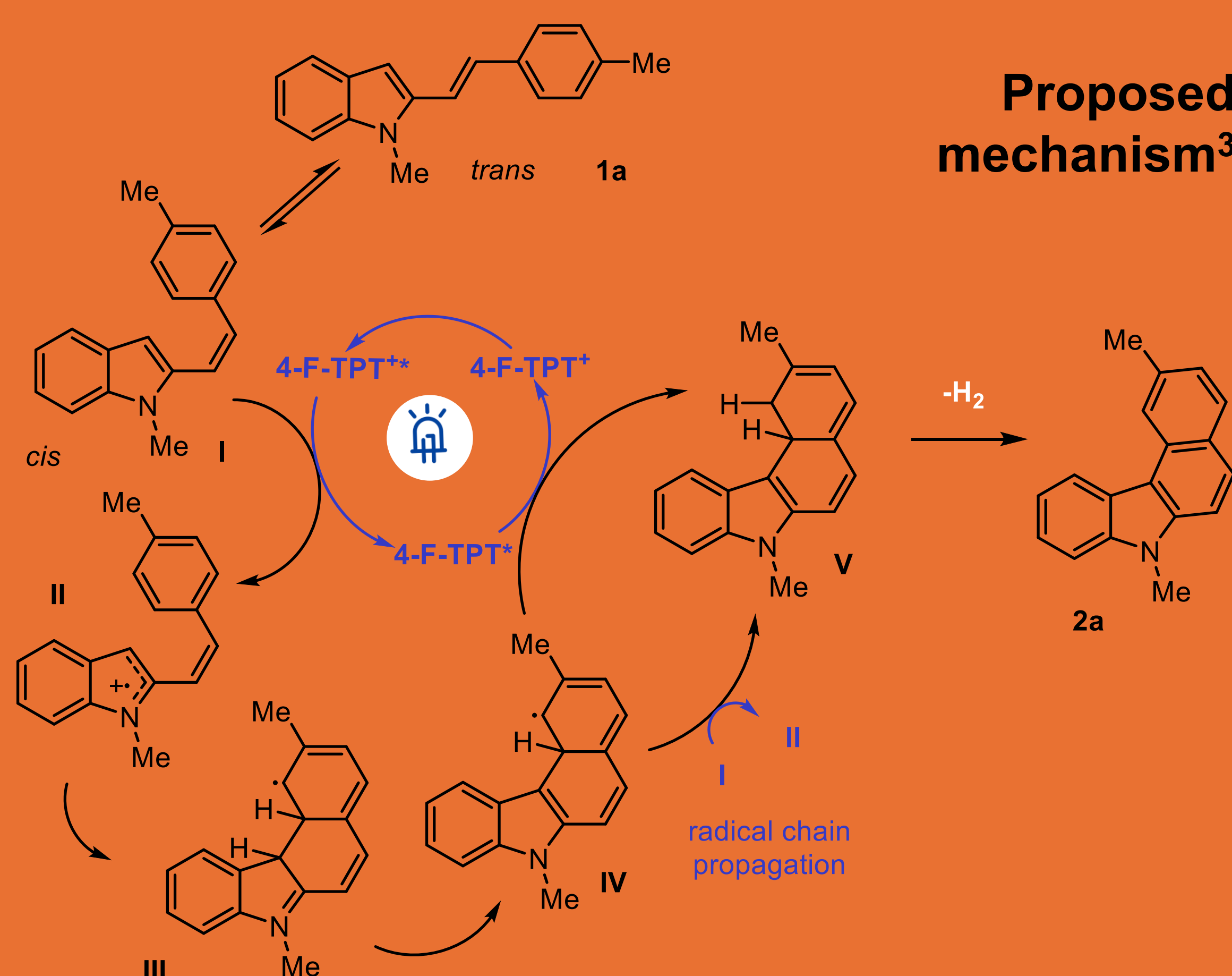


R = Me **2k** 63%
R = MeO **2l** 51%
R = F **2m** 50%

in progress



Proposed mechanism³



Future perspectives

- Expansion of the scope for the synthesis of other indole-based azahelicenes
- Evaluation of the optical properties of the products
- Separation of the enantiomers through chiral HPLC

Acknowledgements

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References

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