

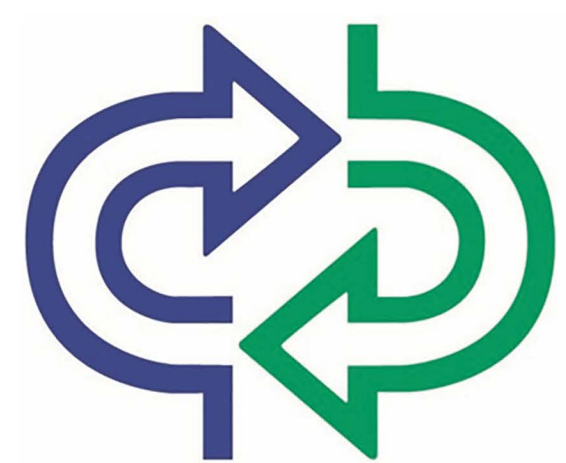


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Enantioselective Construction of Coumarin/Indandione-Fused Spirocyclopentane and Spirooxindole-Fused Cyclopenta[*c*]chromen-4-ones via (3+2) Cycloaddition

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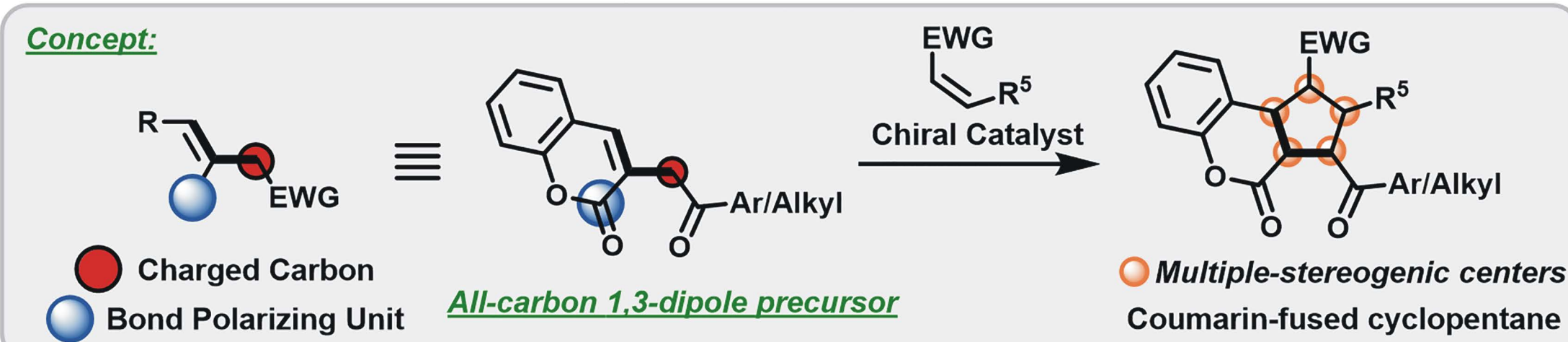
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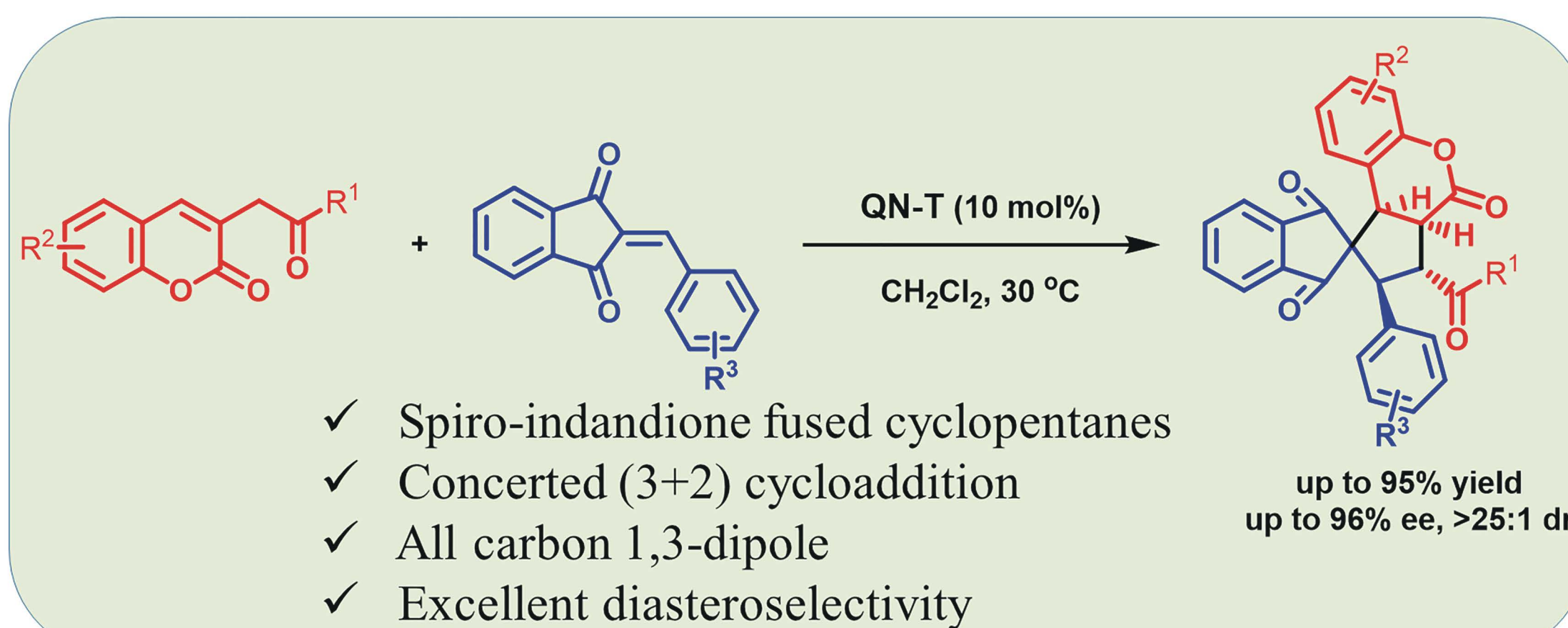
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Abstract: An organocatalyzed (3+2) cycloaddition reaction is demonstrated towards the enantioselective synthesis of coumarin/indandione-fused spirocyclopentanes and spirooxindole-fused cyclopenta[*c*]chromen-4-ones by using 3-homoacyl coumarins and different electrophiles. In addition, a new method for the efficient synthesis of indeno[1,2-*b*]pyrrole derivatives were developed via chemoselective phosphorus zwitterion formation/*N*-acylation/cyclization/Wittig reaction sequence. Furthermore, the preparation of spiro-indene-1,2'-[1,3,4]oxadiazols has also been realized by simple modification of zwitterions with PPh₂Me.

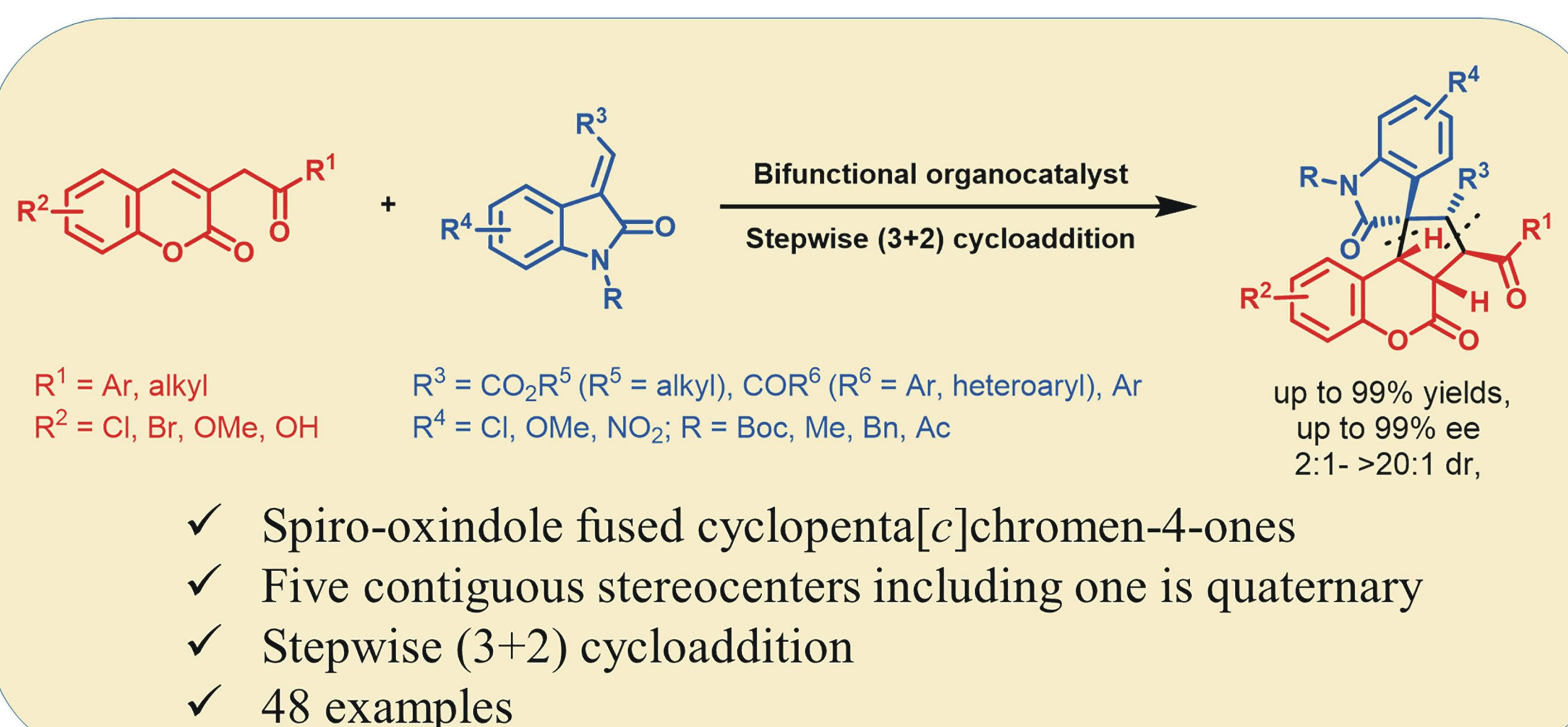
Research Work



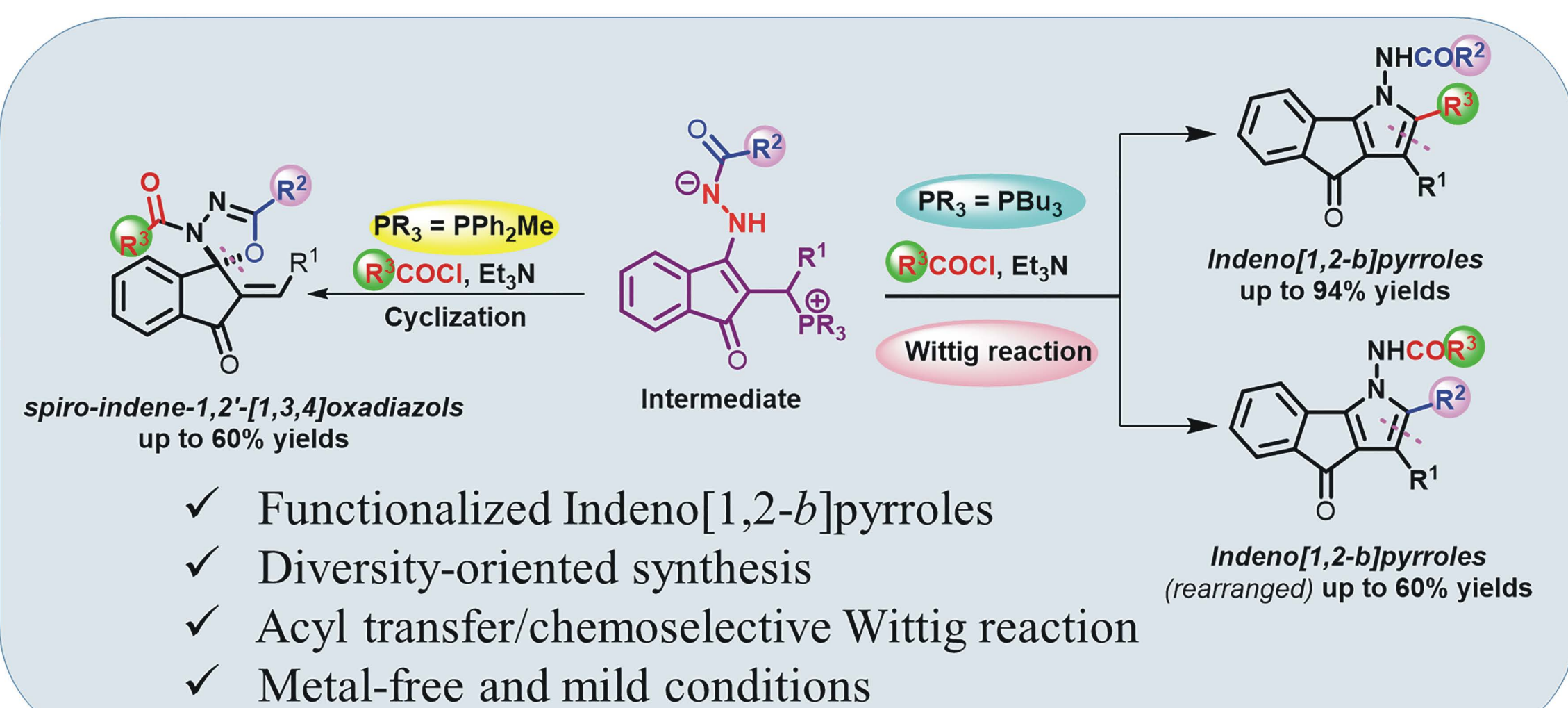
1. 3-Homoacyl coumarin: an all carbon 1,3-dipole for enantioselective concerted (3+2) cycloaddition



2. Enantioselective construction of spirooxindole-fused cyclopenta[*c*]chromen-4-ones bearing five contiguous stereocenters via a stepwise (3+2) cycloaddition



3. Construction of Indeno[1,2-*b*]pyrroles via chemoselective *N*-acylation/cyclization/Wittig reaction sequence



Conclusion

- We have utilized 3-homoacyl coumarin as an all carbon 1,3-dipole precursor for the enantioselective (3+2) cycloaddition reactions to construct spiro and fused complex structures bearing multiple stereocenters in high yields and excellent stereoselectivities.
- A new method was described for the synthesis of indeno[1,2-*b*]pyrroles and their rearranged adducts proceeding Wittig approach instead of β -acylation. The formation of spiro-indene-1,2'-[1,3,4]oxadiazol has been found as a key step in this strategy.

References

- 1) Y.-R. Chen, M. R. Ganapuram, K.-H. Hsieh, K.-H. Chen, P. Karanam, **S. S. Vagh**, Y.-C. Liou, and W. Lin, *Chem. Commun.*, 2018, 54, 12702-12705.
- 2) **S. S. Vagh**, P. Karanam, C.-C. Liao, T.-H. Lin, Y.-C. Liou, A. Edukondalu, Y.-R. Chen, and W. Lin, *Adv. Synth. Catal.*, 2020, 362, 1679-1685.
- 3) A. Edukondalu, **S. S. Vagh**, T.-H. Lin, and W. Lin, (*manuscript under review*)

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