

UTILIZING 3-ARYL-3-HYDROXYPROPANOIC ESTER SUBUNITS IN THE FORMATION OF CHIRAL LIQUID CRYSTALS

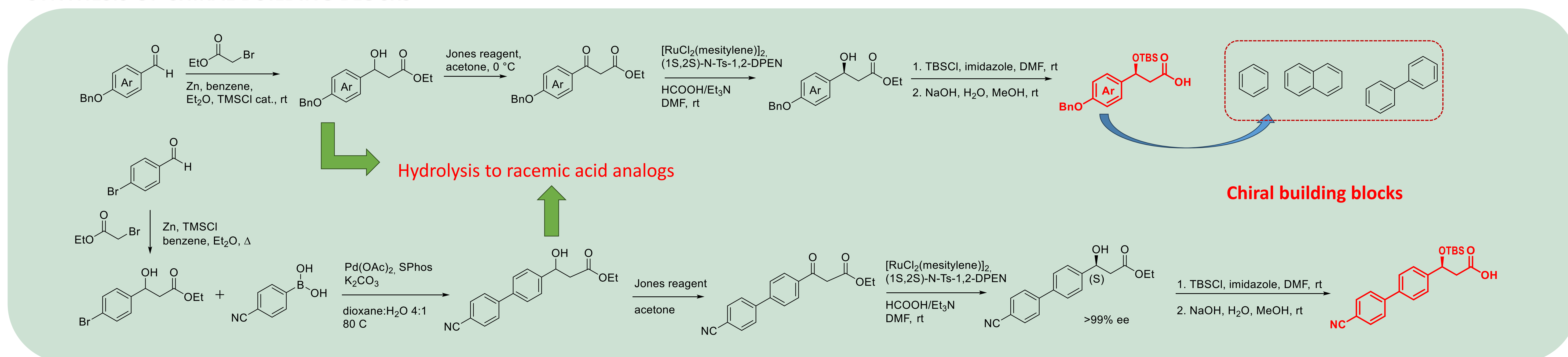
Anamarija Knežević, Irena Dokli, Antonija Ožegović, Aleksandra Šimanović, Andreja Lesac

Ruđer Bošković Institute, Bijenička 54, 10000 Zagreb, Croatia

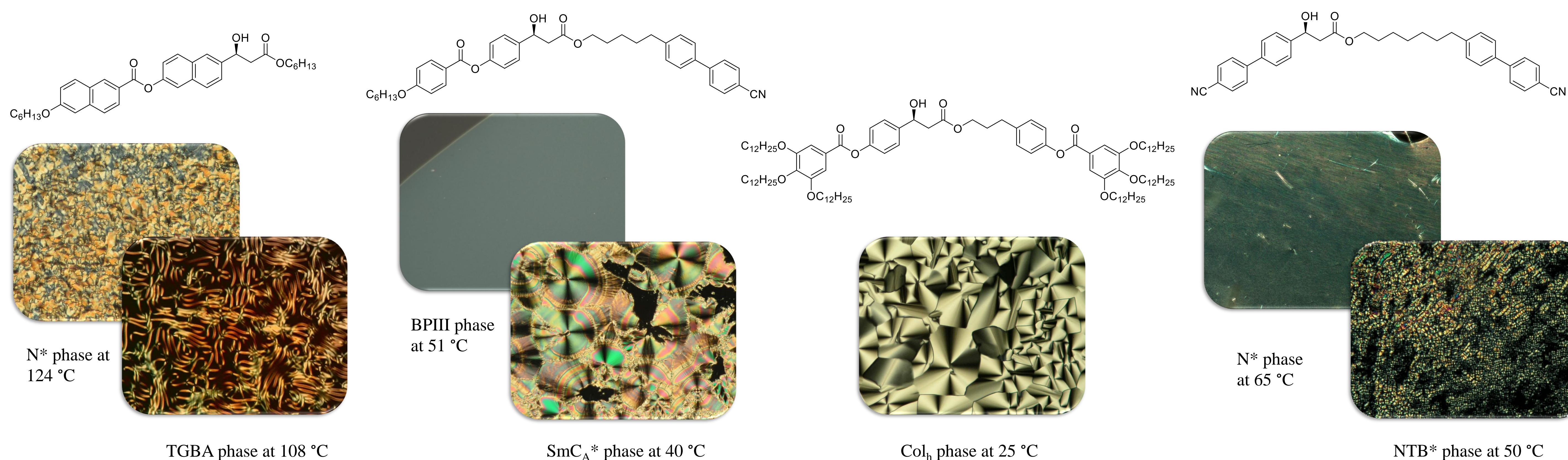
INTRODUCTION

Chiral liquid crystals (LCs) are promising functional soft materials for both fundamental science and innovative technological applications given their distinctive optical and mechanical properties [1,2]. Chiral 3-aryl-3-hydroxypropanoic ester moieties are versatile building blocks for the preparation of LC compounds [3], which were employed for the preparation of chiral LC compounds of diverse topologies. The same methodology was applied to prepare chiral analogs of bent-shaped dimers with cyanobiphenyl moieties at both ends. These molecules are particularly interesting due to the presence of terminal polar groups and spontaneous structural chirality observed in their achiral counterparts in the twist-bend nematic phase (NTB). The successful introduction of the chiral moiety into such a system will enable correlation between chirality of different origins and potentially lead to the discovery of new LC phases.

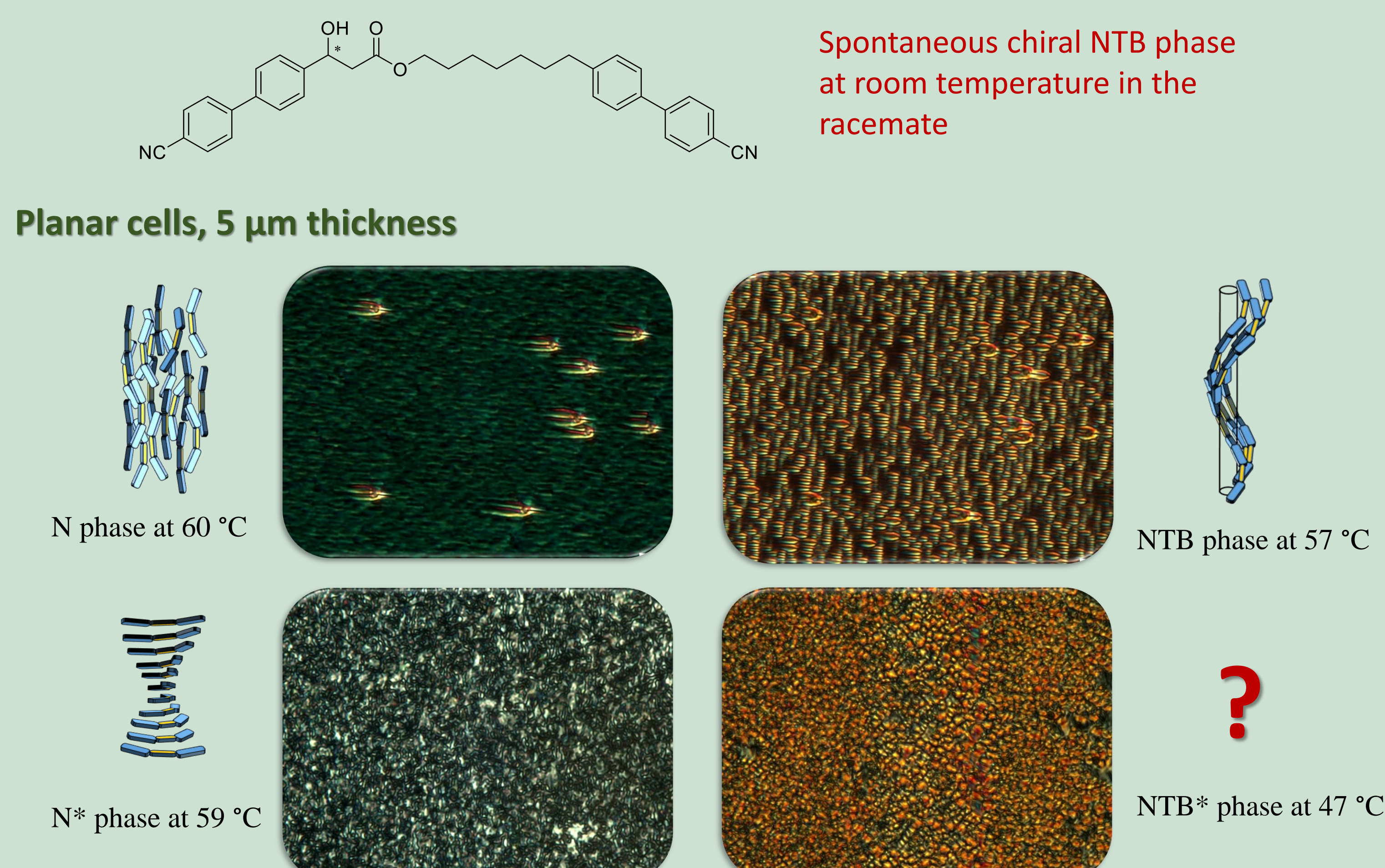
SYNTHESIS OF CHIRAL BUILDING BLOCKS



MESOMORPHIC PROPERTIES – molecules of diverse topologies

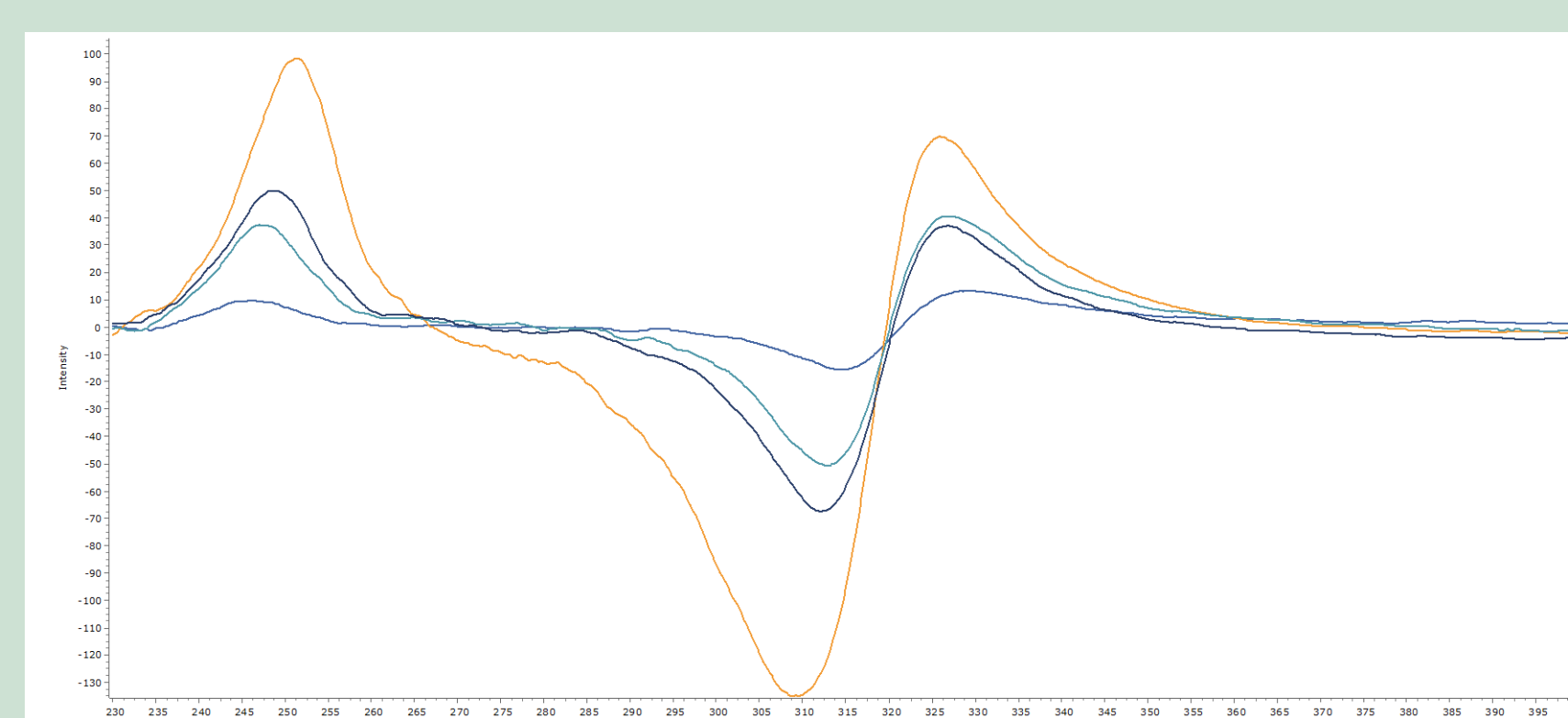
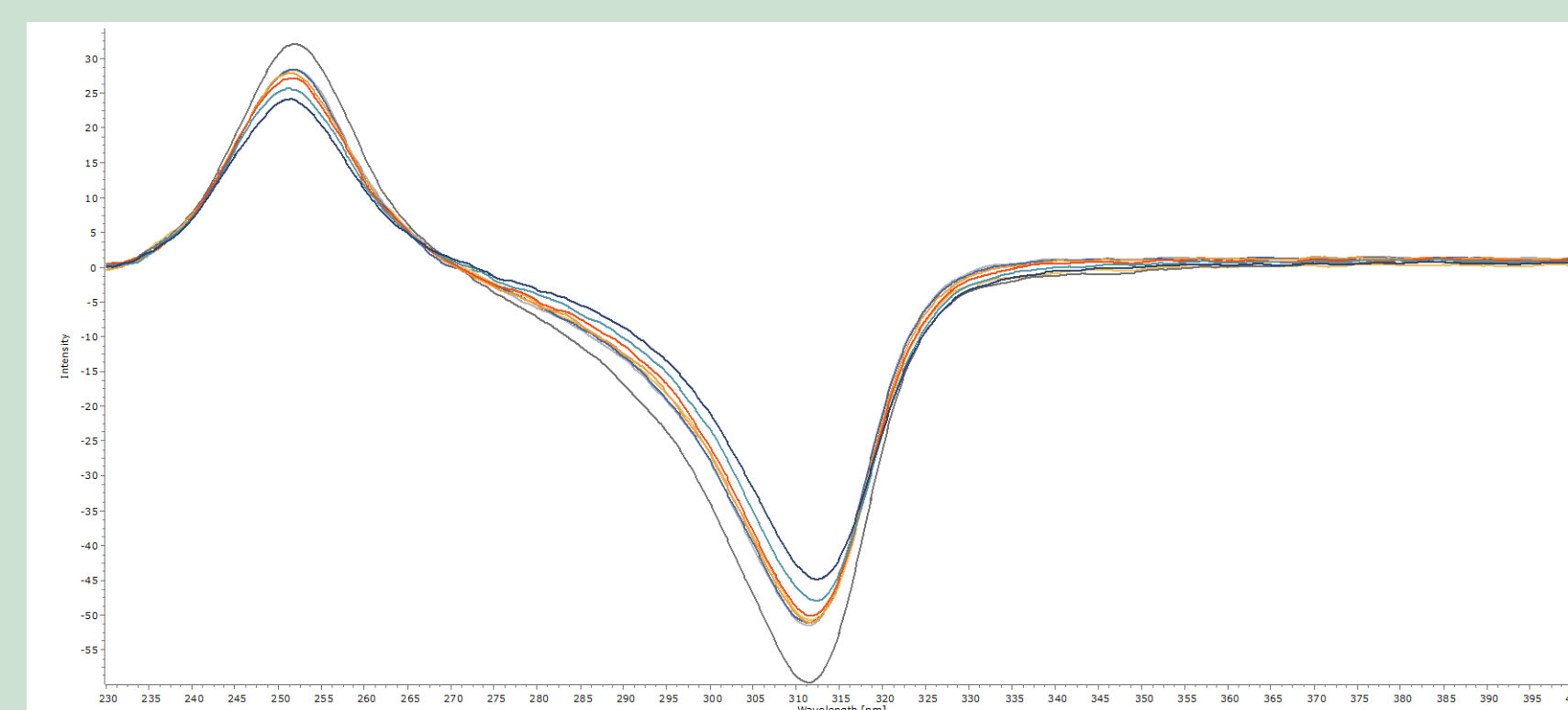


Comparison of optical properties of racemic and enantiopure bent-shaped molecules



Circular dichroism spectroscopy – thin films

Thin films were prepared using the spin coating method. Multiple spectra shown correspond to CDs recorded for rotated samples.



CONCLUSION

The chiral 3-aryl-3-hydroxypropanoic ester has demonstrated its versatility as a building block for the preparation of chiral LC compounds with a variety of topologies. The cyanobiphenyl compound that incorporates the related moiety is of particular interest. Its racemic form displays a nematic phase and a spontaneous chiral NTB phase at room temperature, whereas the chiral sample exhibits corresponding chiral phases. This opens up possibilities for the comparison and detailed analysis of these compounds' properties and paws the way to further investigation of the correlation between chiralities of diverse origins.

REFERENCES

- [1] Wang, L.; Urbas, A. M.; Li, Q. *Advanced Materials* **2020**, 32 (41), 1801335.
- [2] Ariga, K.; Mori, T.; Kitao, T.; Uemura, T. *Advanced Materials* **2020**, 32 (41), 1905657.
- [3] Dokli, I.; Ožegović, A.; Šimanović, A.; Hromin, M.; Knežević, A.; Višnjec, A.; Lesac, A. *J. Org. Chem.* **2022**, 87 (21), 14045-14057.

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