

## Novel liquid crystalline fluorene and fluorenone MIDA boronates: influence of alkyl vs alkoxy side chains on the mesomorphic properties

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Previous studies have demonstrated that MIDA (N-methyl-iminodiacetic acid) boronates, in contrast to pinacol borolanones and boronic acids, can introduce liquid crystalline behaviour due to their high dipole moment.[1] In this work the beneficial MIDA headgroup was combined with fluorene and fluorenone cores, which are well-established building blocks for functional materials.[2]

Four series of novel liquid crystalline MIDA boronates with a fluorene and fluorenone mesogenic unit bearing either an alkyl or alkoxy side chain were synthesized. The compounds were characterized by POM (polarizing optical microscopy), DSC (differential scanning calorimetry) and XRD (X-ray diffraction). The influence of the core unit and particularly the side chains on the mesomorphic properties was examined.[2]

Both fluorene- and fluorenone-based MIDA boronates showed SmA phases with the fluorene derivatives displaying broader mesophases than the fluorenonones. However, the type of side chain had a greater impact on the mesophase behaviour. The alkyl-substituted derivatives showed significantly decreased melting transitions and enhanced thermal stability compared to the corresponding alkoxy derivatives. These results demonstrate that the MIDA unit can be successfully combined with mesogenic building blocks to obtain novel liquid crystalline materials. Moreover, the replacement of the archetypal alkoxy sidechains by alkyl sidechains provides a tool to broaden the mesophase range and to overcome thermal stability problems, which might be useful for other calamitic liquid crystals.[2]

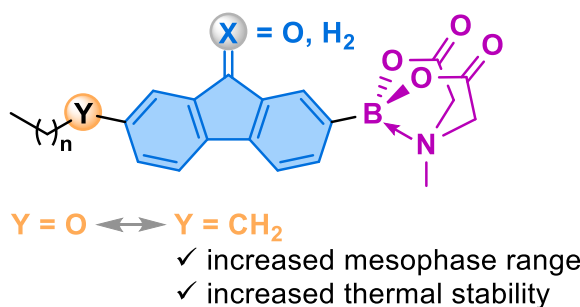


Figure 1. Fluorene and fluorenone MIDA boronates with alkyl or alkoxy side chain.

### References

- [1] T. Wöhrle, R. Gündemir, W. Frey, F. Knecht, A. Köhn, S. Laschat, *Chem. Eur. J.*, **23**, 4149-4159, (2017)
- [2] C. Schilling, A. Zens, S. Laschat, *Liq. Cryst.*, **51**, 641-655, (2024)

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