

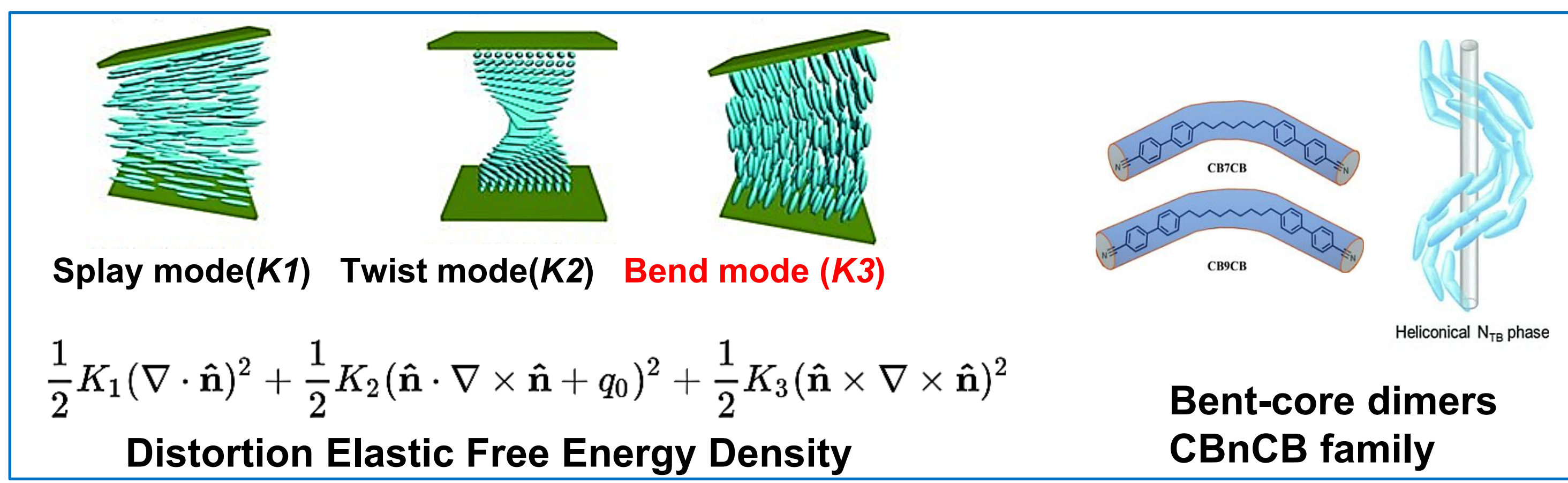
Role of elastic constants in the textures of the 8CB-CB7CB mixtures

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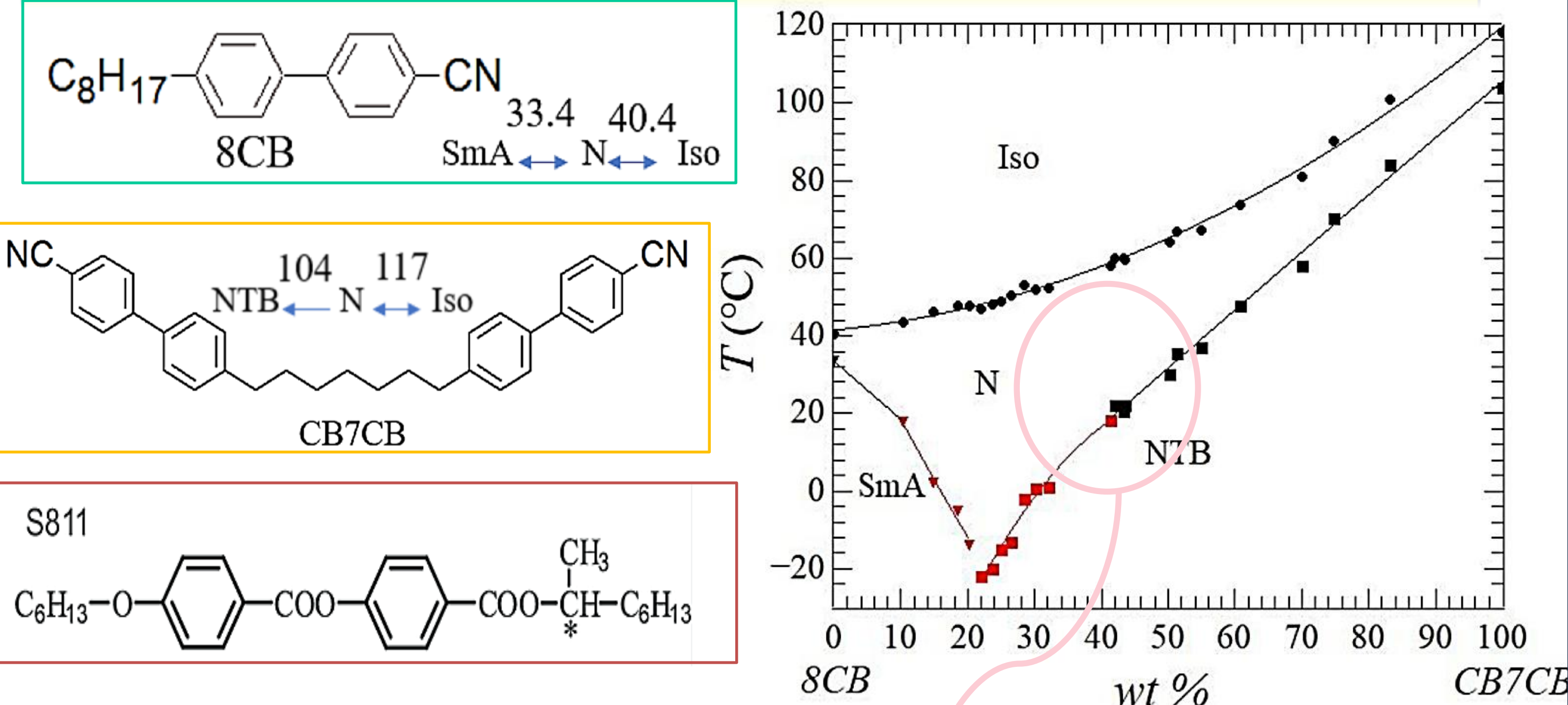
INTRODUCTION & AIM

Nematic liquid crystals possess long-range orientational order described by a director field whose distortions are governed by the Frank elastic constants K_1 , K_2 , and K_3 [1]. In bent-core dimers such as CB7CB [2], the bend elastic constant K_3 becomes anomalously low, significantly affecting director configurations and the resulting optical textures. When mixed with the rod-like liquid crystal 8CB, the nematic phase retains its orientational order while exhibiting reduced bend elasticity. The aim of this work is to investigate how the elastic properties, particularly the low K_3 value, influence the formation and evolution of striped nematic textures in 8CB-CB7CB mixtures.

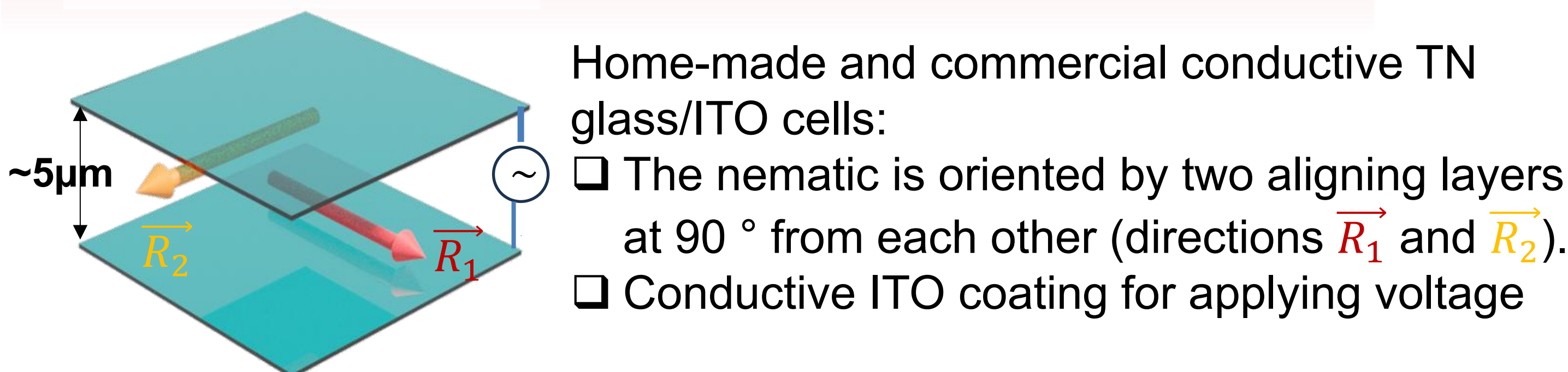


METHOD

We have used the mixture of cyanobiphenyls and a few % of chiral dopant S811



- Nematic Phase can be stabilized down to room temperature
- while showing a vanishing K_3 modulus [3]



For characterization, we used Polarization Optical Microscopy (POM) and for elastic constant measurement, used impedance spectroscopy!

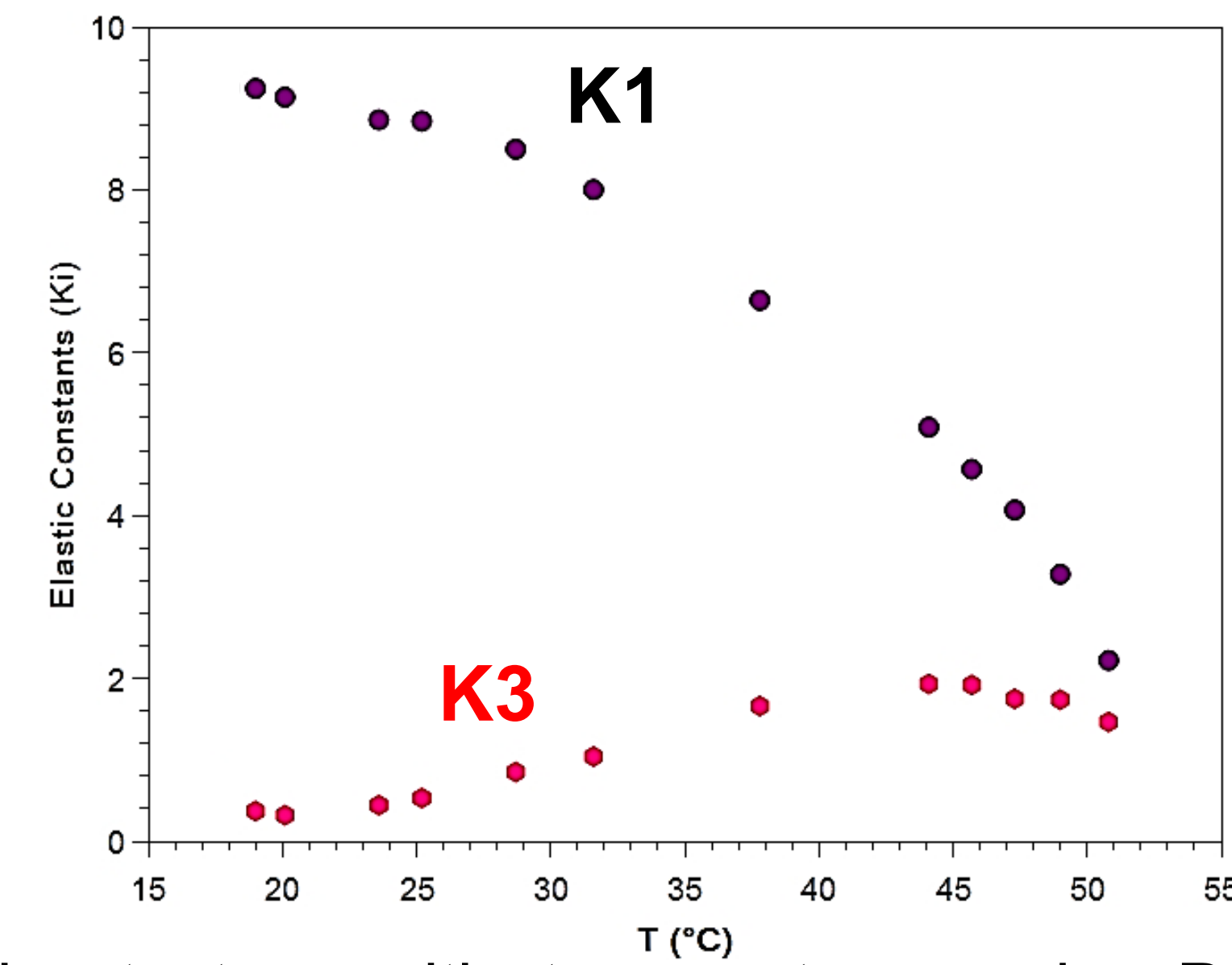
FUNDINGS & REFERENCES

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²I. Dozov, *Europhys. Lett.* 56, 247 (2001).
³A. Aouini, M. Nobili, E. Chauveau, P. Dieudonné-George, G. Damême, D. Stoenescu, I. Dozov, and C. Blanc, *Crystals* 10, 1110 (2020).

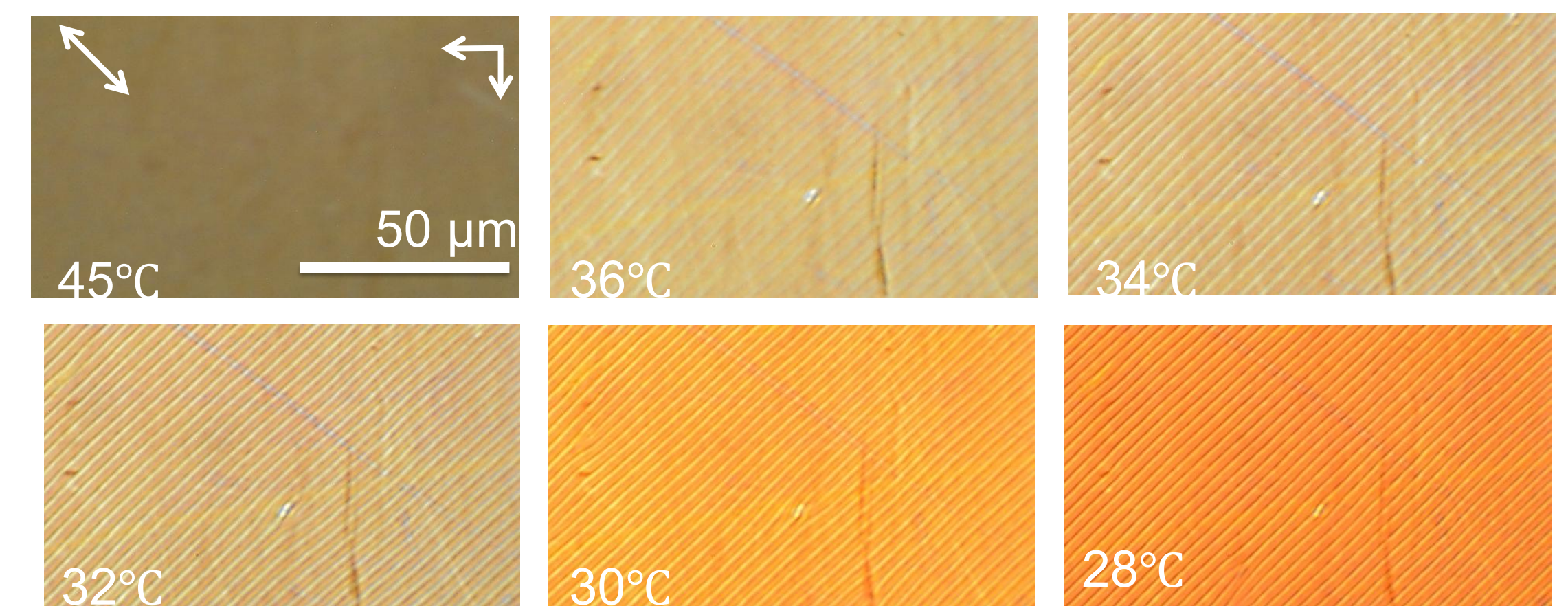
FUNDINGS: ANR BestNematics – 2015-2019
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RESULTS & DISCUSSION

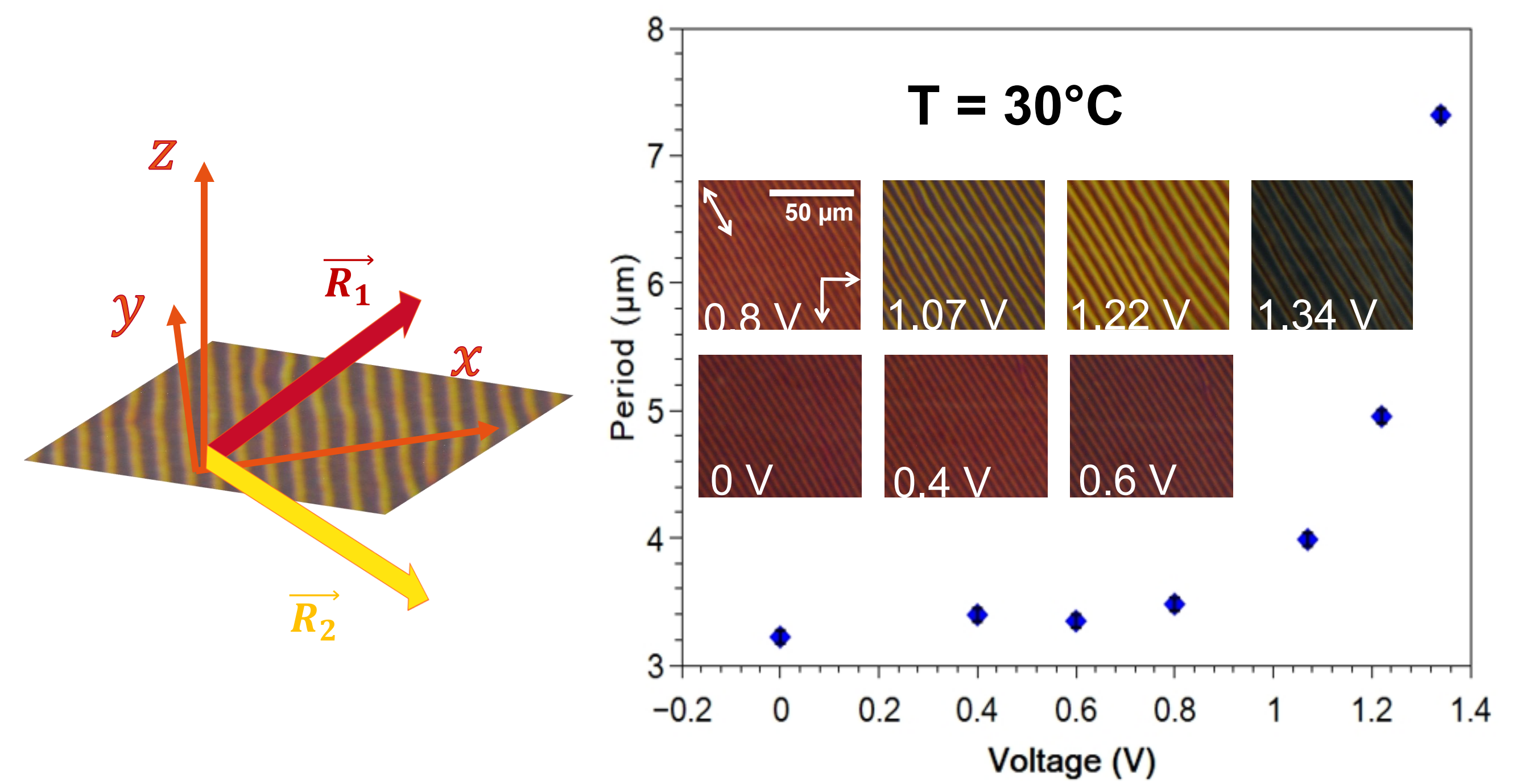
- Measured the elastic constant K_1 & K_3 at different temperatures. Bend elastic constant K_3 decreases with the temperature.



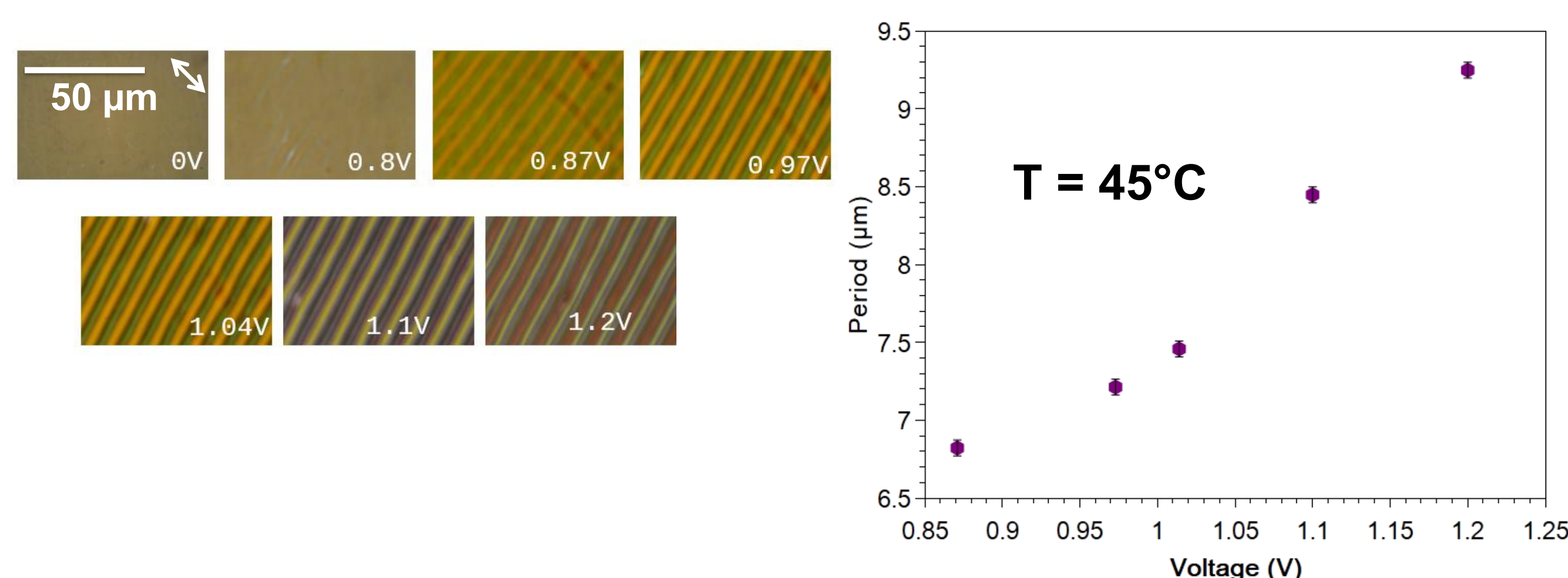
- Characterizing the texture with temperature under POM: Homogenous texture at high temperature. From 36°C, striped texture arises.



- Characterization of the texture at 30°C with voltage: Periodicity increases with the voltage.



- Characterization of the texture at 45°C with voltage: Induces striped texture with voltage & periodicity increases with the voltage.



CONCLUSION & PERSPECTIVE

The study highlights the significant role of elastic constants in forming the textures of the 8CB-CB7CB mixtures, with the reduced bend elastic constant K_3 strongly influencing the formation of periodic structures. The results also demonstrate that temperature and applied voltage affect the texture morphology and periodicity. The field-tunable textures observed in this liquid-crystal system may make it a promising candidate for tunable optical and photonic applications.