

# Liquid-crystal blue phase II stabilized by polymer network

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It is expected that polymer-stabilized blue phase II (BPII) exhibits a higher elastic resistance against lattice deformation by an applied electric field compared to that for blue phase I (BPI). [1] This can be explained by the influence of the structural differences between BPI and BPII. It is considered that the BP is stabilized when the polymers formed within the BP are condensed into disclinations, and the disclinations are then thermally stabilized. [2] In the case of polymer-stabilized BPI, the seven independent disclination lines stabilized by polymers do not contact one another inside the unit lattice. In contrast, the four disclination lines of BPII have an intersection point at the center of the unit lattice. [1,3] Hence, it is anticipated that polymer-stabilized BPII will be more robust to lattice deformation compared with polymer-stabilized BPI. In addition, BPII tends to easily achieve a uniform alignment compared to BPI. [3,4] Hence, a polymer-stabilized BPII has greater potential for practical applications compared to polymer-stabilized BPI.

Herein, we report the polymer stabilization of BPII over a temperature range of 50 °C including RT. This polymer-stabilized BPII was confirmed via polarized optical microscopy (POM), Bragg reflection, and Kossel diagrams. The potential application of the polymer-stabilized BPII in photonic crystal (PC) devices is also demonstrated. This work discusses the potential for polymer-stabilized BPII to be used as PCs based on its self-assembled unique periodic structures.

## References

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**Speaker Biography**

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