Abstract Submitted
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Double helix configuration of lyotropic chromonic liquid crystals in cylindrical capillaries with homeotropic anchoring[1] RUI CHANG, School of Chemical and Biological Engineering, Georgia Institute of Technology, KARTHIK NAYANI, JINXIN FU, School of Material Science and Engineering, Georgia Institute of Technology, ELSA REICHMANIS, School of Chemical and Biological Engineering, Georgia Institute of Technology, JUNG OK PARK, MOHAN SRINIVASARAO, School of Material Science and Engineering, Georgia Institute of Technology — We investigate the formation of double helix configuration of Sunset Yellow FCF, a nematic lyotropic chromonic liquid crystal (LCLC), confined in cylindrical capillaries with homeotropic boundary conditions. Like many other nematic liquid crystals, escape radial configuration is observed right after LCLC fills the capillary. Few minutes after filling the capillary, the escape radial configuration evolves to a new form with an axial twist mediated with domain walls separating opposite handedness. We attribute this behavior to the low twist elastic constant of chromonics. After 12 hours aging, a new ground state of LCLC, two line defects with a double helical configuration is observed. This ground state is the chosen configuration until evaporation of water forces a phase transition to the columnar phase. Additionally, the nematic-isotropic phase transition of LCLC in cylindrical capillaries has some striking and completely unique aspects. Unlike the typical tactoids with nematic and isotropic phases, we find a coexistence of double helix configuration and escape radial configuration mediated with point defects in biphasic temperature range.

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Rui Chang
School of Chemical and Biological Engineering,
Georgia Institute of Technology

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