Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Tactoids and Defects in Nematic-Isotropic Phase Transition in Lyotropic Chromonic Liquid Crystal[1] YOUNG-KI KIM, OLEG D. LAVRENTOVICH, Liquid crystal institute and chemical physics interdisciplinary program, Kent state university, Kent, OH, USA — We explore the structure of nuclei (tactoids) and topological defects (disclinations) in the first-order nematic-isotropic phase transition in self-assembled lyotropic chromonic liquid crystals. The shape of tactoids is determined by orientational elasticity of the liquid crystal, surface tension, and surface anchoring of the director. The positive tactoids (nuclei of the nematic phase) show two pointed ends (cusps). The negative tactoids (nuclei of the isotropic phase) show a variety of shapes, with one, two, or three cusps, depending on whether they nucleate at the core of disclinations of strength 1/2, in a homogeneous nematic, or at the core of a (-1/2) disclination, respectively. Zero-cusp and four-cusp formations are also possible at the core of stabilized disclinations of strength 1 and -1, respectively. The results demonstrate a profound role of surface tension and its anisotropy in the morphological dynamics of phase transitions in liquid crystals.

[1]The work was supported by NSF DMR 1104850 and 11212878.

Young-Ki Kim
Liquid crystal institute and chemical physics interdisciplinary program,
Kent state university, Kent, OH, USA

Date submitted: 28 Nov 2012 Electronic form version 1.4