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Configurational changes in chromonic tactoids upon the addition of polyethylene glycol and salt RUI CHANG, KARTHIK NAYANI, JINXIN FU, ELSA REICHMANIS, JUNG OK PARK, MOHAN SRINIVASARAO, Georgia Institute of Technology — Lyotropic chromonic liquid crystals differ from conventional nematics in that the aggregation process of the plank-like molecules is affected by temperature, concentration, and additives. We study the effects of adding neutral polymer and ionic additives on the aggregation behavior by observing the optical textures of chromonic tactoids. When the aggregates are short, tactoids exhibit the well-known bipolar configuration with the two boojums at the poles. Longer aggregates increase the splay energy close to the boojums and drive an achiral symmetry-breaking transformation. The tactoids then conform to twisted bipolar and escaped-concentric configurations to relieve splay energy via twist and bend distortions. Neutral polymers and ionic additives significantly change the tactoid configurations. The fraction of escaped-concentric tactoids and the twist angle of twist bipolar tactoids increase with the addition of polyethylene glycol (PEG). The condensing effect of PEG elongates the aggregates and facilitates the formation of twist bipolar and escape concentric tactoids. The effects of NaCl on the tactoidal configuration depend on both sample and salt concentrations. The configurational transformation is rationalized by the screening of electrostatic repulsion by NaCl.

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