

Keeping an eye on drying liquid crystals

Qing Zhang ^a, Chenhui Peng ^b, Irmgard Bischofberger ^a
^aMIT, ^bUniversity of Memphis

As a 2 mm drop of an isotropic aqueous liquid crystal (disodium cromoglycate solution) dries on an untreated surface, the suspended liquid crystal aggregates are transported to the drop perimeter by an evaporation-driven capillary flow. This leads to a non-uniform liquid crystal concentration along the drop radius, as evidenced by different liquid crystal phases from the drop edge to the center: columnar, nematic, and isotropic (right image). The drop is visualized from below under crossed polarizers.

At later time, the region of isotropic phase in the center transitions to nematic phase. The flow-induced director field of the nematic phase can be tuned by the surface anchoring conditions. For circular anchoring conditions, the director field is fairly uniformly aligned (left image).

