

Nano-curvatures based on liquid crystals

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Layering is found and exploited in a variety of soft material systems, ranging from complex macromolecular self-assemblies to block copolymer and small-molecule liquid crystals. Recently, we have reported that the thermal sublimation induced transformation of layering structure from toric focal conic domains (TFCDs) of smectic liquid crystal (LCs) to multi-dome structure. This phenomenon is highly affected by thermal annealing condition and suggests a possibility for the fabrication of various curvature structures. Here, we report that a series of simple thermal treatments produce various kinds of curvatures having multi-scale from nm to μm using sublimable smectic liquid crystals. Especially, in-situ transformation of Gaussian curvature at micro-scale was controlled by temperature-variation and directly investigated by microscopy.