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**Imaging helical nano-filament and modulated smectic phases of bent shaped liquid crystals by cryo-TEM** CUIYU ZHANG, Kent State University, HANS SAWADE, I.N. Stranski Institute, TU Berlin, WOLFGANG WEISS-FLOG, Martin Luther University Halle-Wittenberg, ANTAL JAKLI, Kent State University — Recently we showed that cryo-TEM can be used to visualize smectic layers of thermotropic liquid crystals. Here we describe cryo-TEM studies of the nanofilaments (B4 phase) and the modulated smectic layers (B7 phase) of various bent shaped liquid crystal compounds. In the B4 phase a periodic array of about 15 nm wide bands of parallel stripes, separated by a distance equal to the layer spacing, appear with a periodicity of about 120 nm corresponding to the half pitch of the nanofilaments. As cryo-TEM shows only layers that are parallel to the electron beam, these results indicate grains of straight layers twisted along the filament axis compose the nano-filaments. In the B7 phase cryo-TEM not only can visualize the smectic layers, but also the periodic modulation indicating defects with less dense molecular packing. In addition we observe a labyrinth structure with curvature radii in the 150 nm ranges. These results yield information complementary to freeze fracture TEM and X-ray observations.

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