Surface disclination cores in B_2 phase of bent-shaped molecules described by Peierls-Nabarro model

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Peierls-Nabarro model originally proposed to describe dislocation core in solids, nematics [1] and chiral smectics C* [2] is used to describe core structures of 2π- and π-surface disclinations in B_2 phase of bent-shaped molecules. Structures of disclination cores are determined by surface anchoring. Core parameters like core widths (and positions of two partial π-disclinations in the case of 2π-disclination) are estimated using surface anchoring energy determined for 10WDVI and 11BVID11 materials [3] by other model [4]. Disclination core widths are usually narrow for strong anchoring. In such a case they are hardly observable, nevertheless, they can exist. As an example, 2π- disclination core is schematically depicted in Figure 1.

References:
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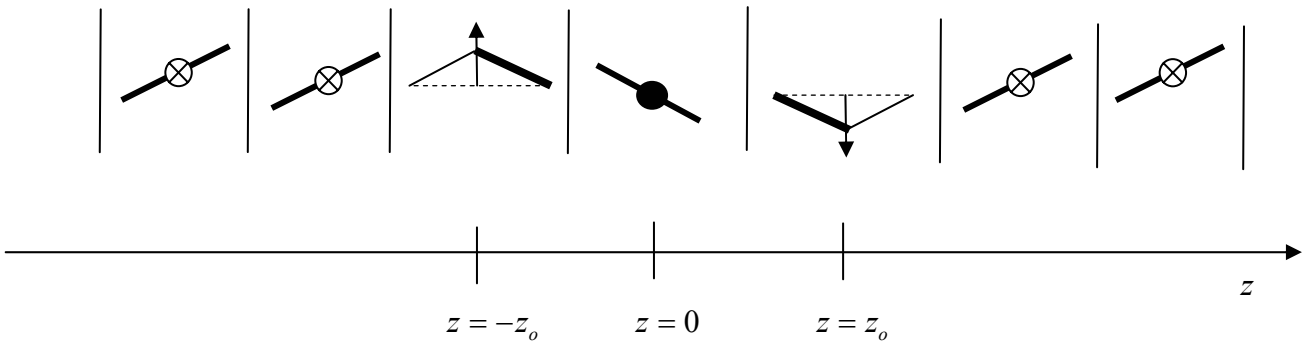

Figure 1: Schematic drawing of the director profile of 2π-disclination core on the sample surface. Molecular orientation in neighboring layers (having their normal parallel to z-axis) is represented by triangles where the thicker line corresponds to the arm of the bent-shaped molecule inclined toward the observer. Full or dashed lines indicate the projection of the molecular director $\vec{n}$ onto the plane of the figure which is the sample surface. Director $\vec{n}$ rotates around z-axis. Molecular spontaneous polarizations are depicted by arrows or by symbols (•) or (×) corresponding polarization pointing up or down, respectively.

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