Liquid Crystal properties and Self Alignment of Silver (Ag) Nanowires as a Function of Flow

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We study the liquid crystal properties of nanowires of silver (Ag) as a function of flow of the solvent. We are interested in the structure intermediate between the liquid crystal phase and the isotropic phase (the heterogenous phase) and how preferentially “ordered” this phase becomes with flow [see, for example, 1-5]. This heterogenous phase refers to that phase where the NW’s are aligned in general along one direction, like a liquid crystal, but from NW to NW they vary in their directions as shown in Figure 1.

Specifically, we are interested in finding the flow-concentration point where the electrical properties (IV curve) are: 1. Along one direction; and, 2. At a maximum along that particular direction. This behavior is shown in Figure 2. Flow is varied in our case by having a substrate with gratings of varying depth in them. The flow due to the grating and the thickness of the film, plus the size of the nanowires will dictate the degree of order in the heterogeneous phase. This order dictates how the electrical properties orient in the resulting film. These studies can be expanded to include other semiconducting and/or metallic nanowires [1-4].

References:

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