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Fluorophores as Guests in Crowded Star-Shaped Host Mesogens: A New Frontier in CPL Emission

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Star-shaped mesogens **1** have been meticulously designed to create free intrinsic voids that facilitate the uptake of a diverse range of guest molecules.[1] These include simple hydrogen bond donors,[1] anthracene chromophores,[1] Blatter radicals [2] and, more recently, nucleic acid derivatives.[3] However, liquid crystals (LCs) serve as versatile matrices for fluorophores, and the inherent LC structure can significantly influence emission spectra.[4] Consequently, integrating fluorophores as pseudo-guests within the host scaffold **1** presents as an intriguing opportunity to explore the impact of the matrix on emission properties such as wavelength, quantum efficiency and circular polarization. These properties may be enhanced by Förster resonance energy transfer from the LC host. This study focuses on synthesizing the host with different numbers of chiral and nonchiral alkoxy chain derivatives, followed by the incorporation of various fluorophores into the system. This design provides a platform for investigating the influence of the aliphatic volume fraction on the self-assembly process resulting in a columnar or gyroid cubic phases.[3] The mesophases are rigorously characterized using polarized optical microscopy, differential scanning calorimetry, and X-ray scattering to elucidate intricate structural transitions and their impact on photophysical properties.

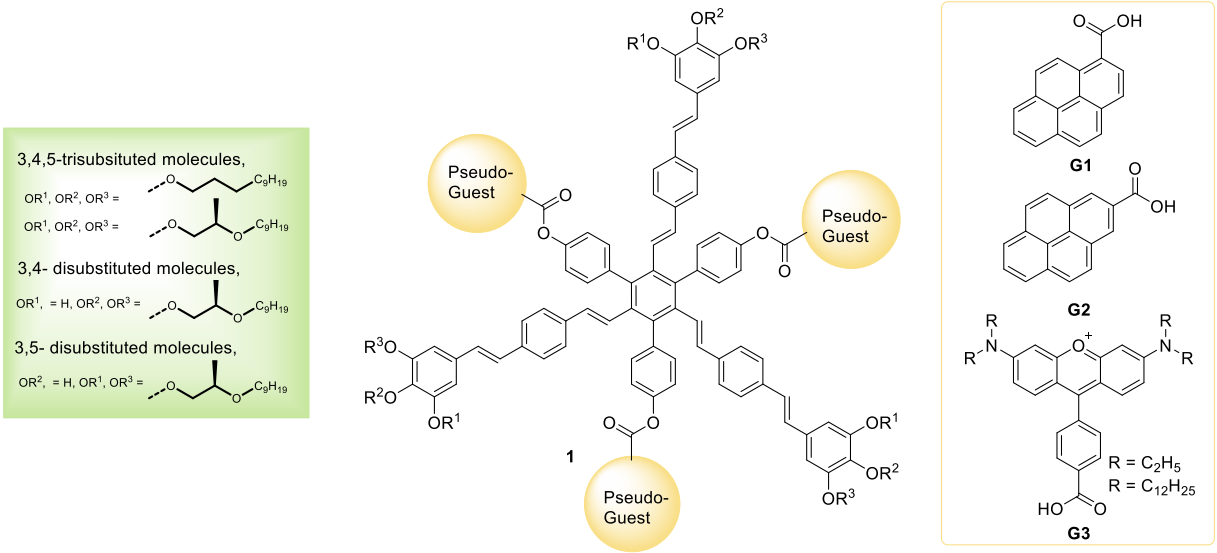

*Figure 1. Structure of host mesogens **1** and pyrenecarboxylic acid derivatives (G1 and G2), and rhodamine derivatives (G3) as guest molecules.*

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