

Abstract Submitted
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Calorimetric and Optical Studies of Cholesterol-Rich Filamentous, Helical Ribbon, and Crystal Microstructures KLAIDA KASHURI, GERMANO S. IANNACCHIONE, Worcester Polytechnic Institute (WPI), YEKATERINA A. MIROSHNIKOVA, YEVGENIYA V. ZASTAVKER, Franklin W. Olin College of Engineering, WORCESTER POLYTECHNIC INSTITUTE (WPI) TEAM, FRANKLIN W. OLIN COLLEGE OF ENGINEERING TEAM — Calorimetry (differential-scanning and modulation) and optical phase contrast microscopy studies have been performed on the filamentous, helical ribbon, and crystal microstructures formed in Chemically Defined Lipid Concentrate (CDLC). CDLC is a quaternary sterol system consisting of a cholesterol, bilayer-forming amphiphiles, micelle-forming amphiphiles, and water. Phase contrast microscopy confirms the presence of the three microstructure types in all samples studied. Sample size and temperature scan rate were varied on samples ranging from 1 to 20 mg and rates from 0:017 to 1 degree C/min, respectively. Thermal profiles are strongly dependent on sample size, scan rate, and thermal history. These scans also reveal numerous “transition” features, likely due to melting of various microstructures in CDLC, that generally shift to higher temperatures with increasing sample size. These results indicate that the filamentous, helical ribbon, and crystal microstructures formed in CDLC may be coexisting in a meta-stable chemical equilibrium with each other and the solvent environment from which they grow.

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