Supplementary Material (ESI) for *PCCP*

Structure of lyotropic self-assembled lipid nonlamellar liquid crystals and their nanoparticles in mixtures of phosphatidyl choline and α-tocopherol (vitamin E)

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Synchrotron small angle X-ray scattering (SAXS)

SAXS measurements of the aqueous SPC/VitE bulk liquid crystals and their nanoparticle dispersions were performed at beamline I711 at MAX-lab (Lund University, Sweden), using a Marresearch 165 mm CCD detector mounted on a Marresearch Desktop Beamline baseplate. Bulk liquid crystalline samples were mounted between thin mica windows in a steel sample holder whereas dispersed samples were filled into 1 mm (i.d.) glass capillary at the sample-to-detector distance of 1445 mm. Diffractograms were recorded under high vacuum with a wavelength of 1.235 Å and with the beam size of 0.25 mm × 0.25 mm (full-width-half-maximum) on the sample. The exposure time was 3 and 10 min for the bulk samples and their dispersions, respectively. The resulting CCD images were integrated and analyzed using the Fit2D software provided by Dr. A. Hammersley (http://www.esrf.fr/computing/scientific/FIT2D). Calibrated wavelengths and detector positions were used.

Determination of the lattice parameter and assignment of the *Fd3m* space group

The lattice parameter (a) and the assignment to the $Fd3m$ space group of the I_2 phase in the SPC/VitE system was determined by plotting the inverse of the peak spacing (d^{-1}) versus the square root of the summed squared Miller indices $(h^2+k^2+l^2)^{1/2}$. The slope of the linear fits to the data equals the inverse of the lattice parameter (a^{-1}).

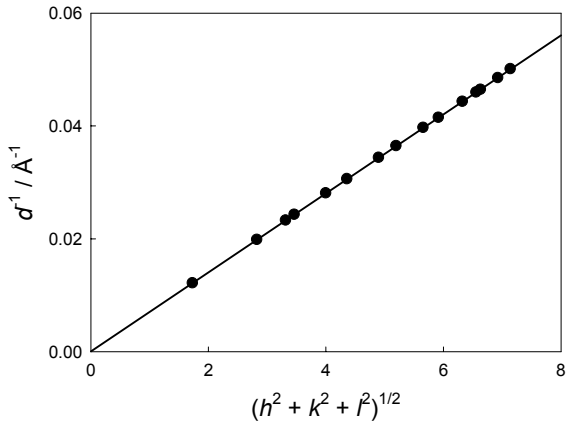

Figure 1_Supplementary Information. Inverse of the peak position d^{-1} vs. $(h^2+k^2+l^2)^{1/2}$ for the SAXS pattern ($Fd3m$) of the bulk SPC/VitE mixture at 30/70 wt/wt in excess water at 25ºC shown in Figure 2 of the article. The line represents a linear fit with $R^2 = 0.9999$.

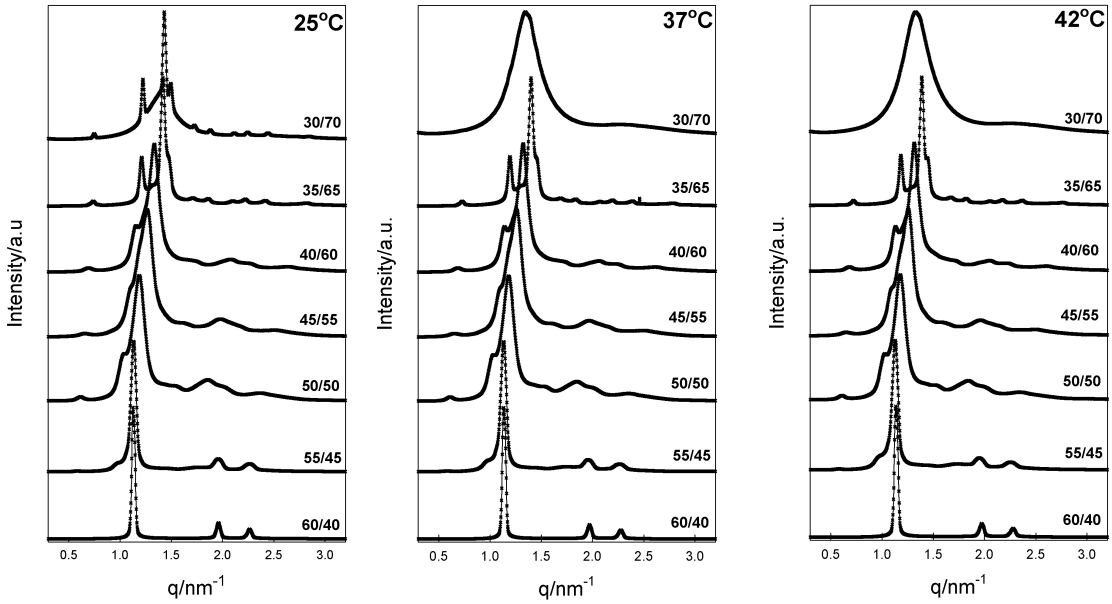

Figure 2_ Supplementary Information. Characteristic SAXS patterns of the bulk SPC/VitE mixtures in excess saline (0.9% NaCl) as a function of lipid composition and temperature measured between SPC/VitE weight ratios of 60/40 to 30/70.