Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Understanding the Photothermal Heating Effect in Non-lamellar Liquid Crystalline Systems, and the Design of New Mixed Lipid Systems for Photothermal On-Demand Drug Delivery

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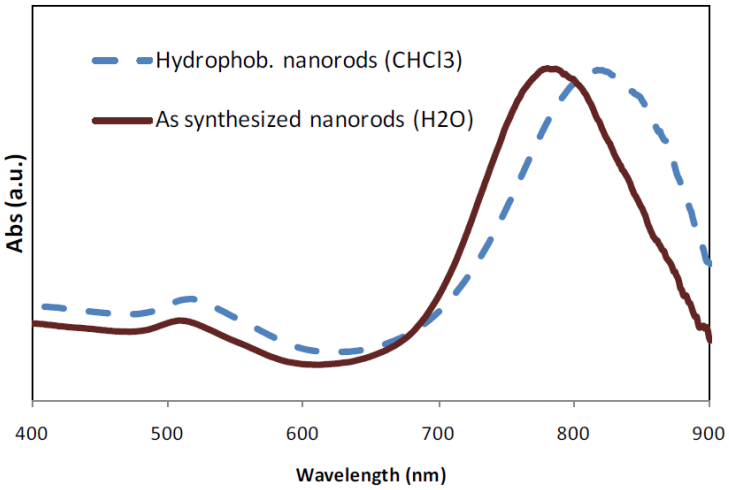


Figure SI1 – Normalised absorption spectra of the 'as synthesized' gold nanorods. Solid line represents CTAB capping in H_2O and dashed line the hydrophobized dodecanethiol GNR in $CHCl_3$.

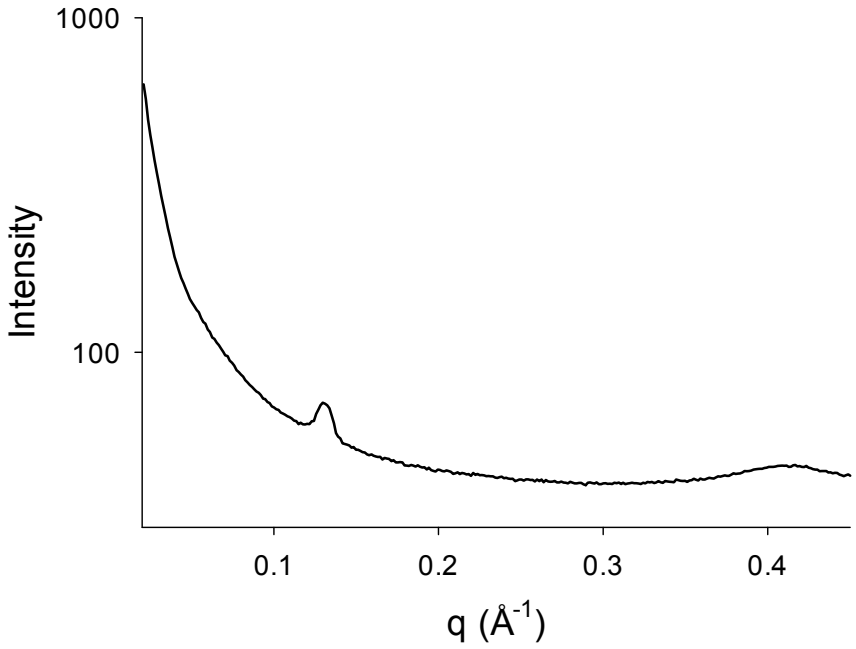


Figure SI2 – Representative SAXS pattern on monoelaidin + 3 nM GNR at temperatures between 62 – 70°C. The scattering at low q is attributed to the GNR in the sample. The broad peak at q = 0.45 $Å^{-1}$ is attributed to Kapton, which was used to encase the sample.

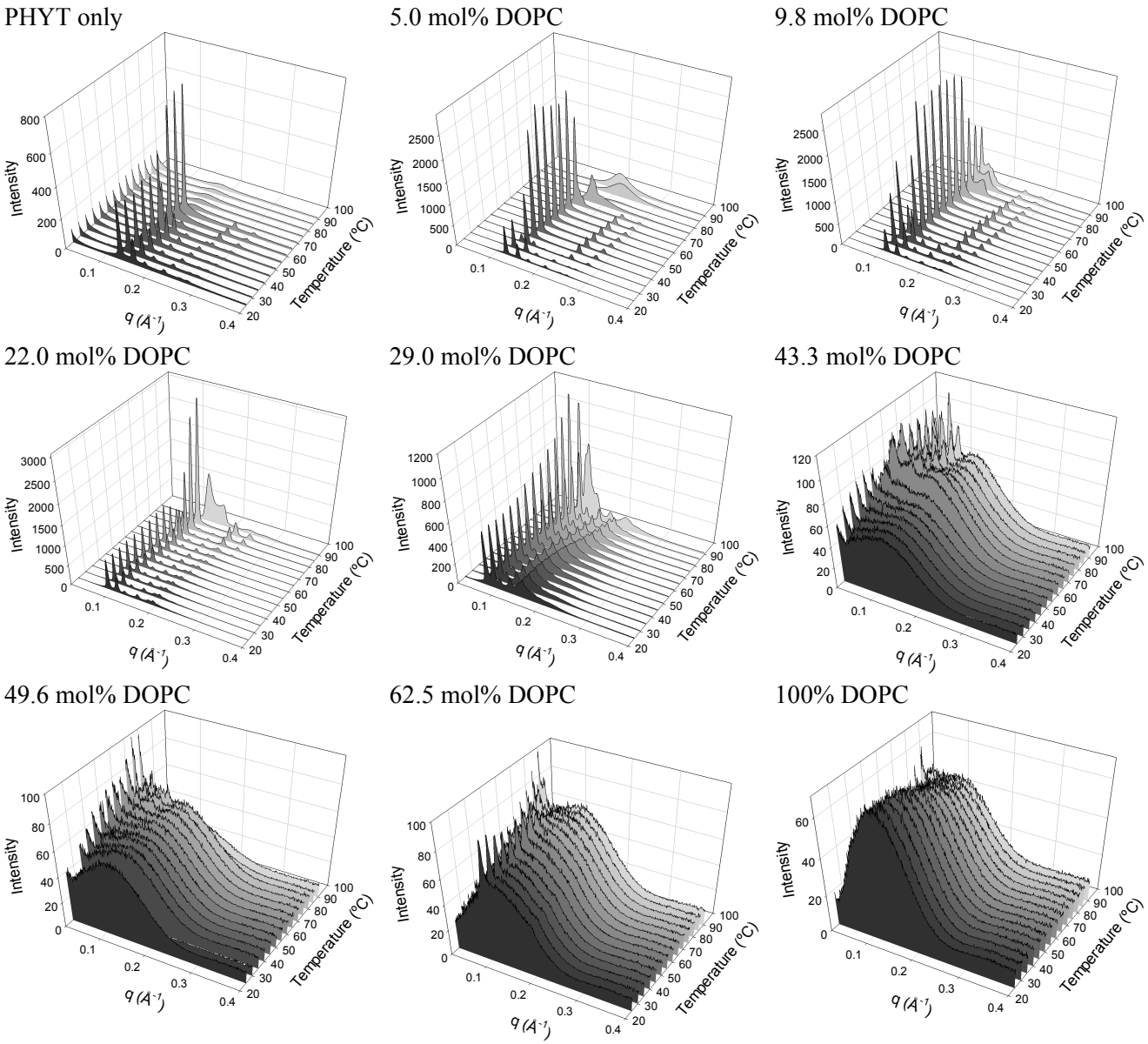


Figure SI3 – Equilibrium SAXS scattering patterns displaying the effect of increasing amounts of DOPC addition on the thermal phase behaviour of PHYT matrices. The molar concentrations of DOPC addition into PHYT in each system are annotated on the graph. All matrices contain lipid mixture:MilliQ water 1:1 (w/w).

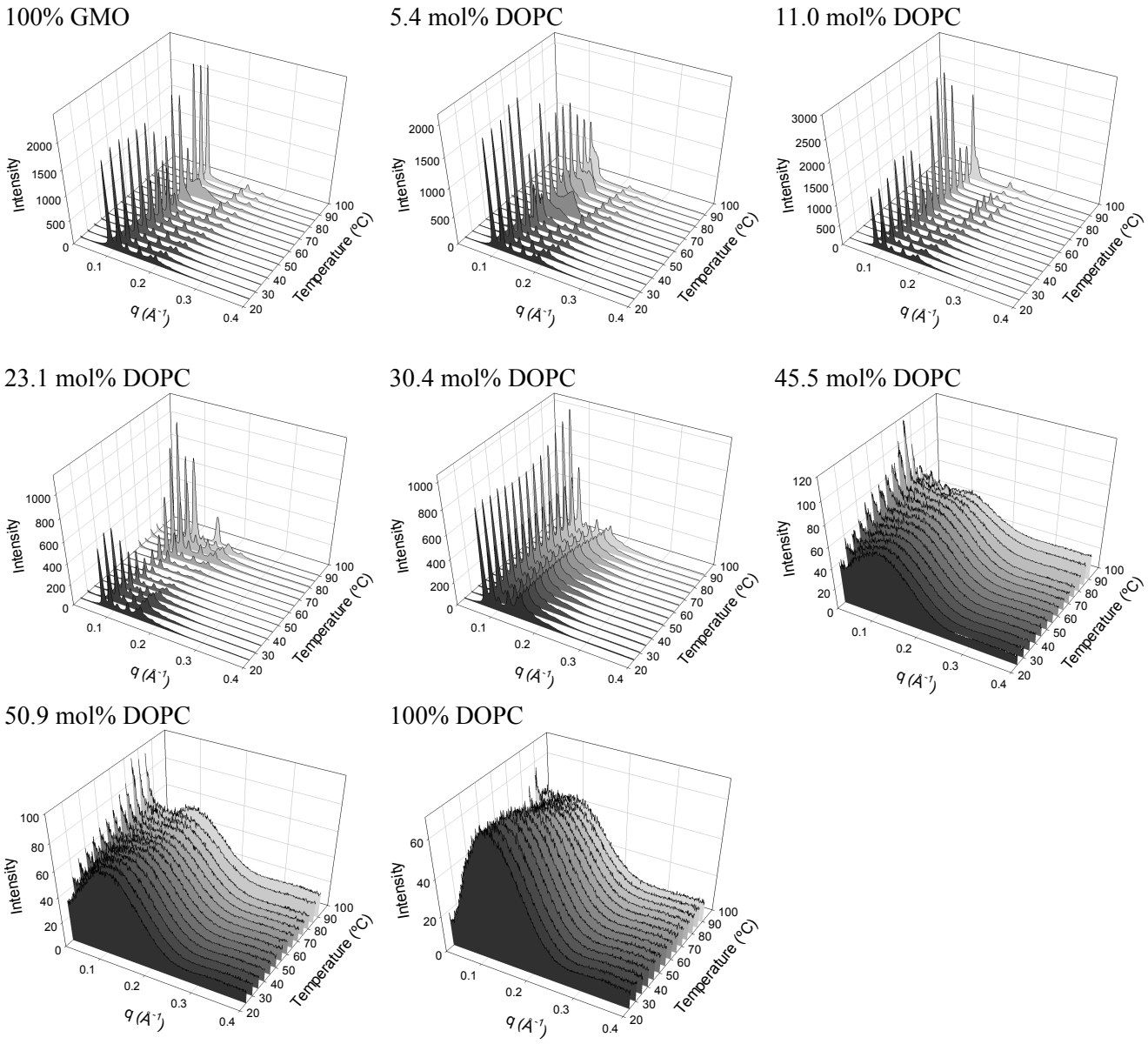


Figure SI4 – Equilibrium SAXS scattering patterns displaying the effect of increasing amounts of DOPC addition on the thermal phase behaviour of GMO matrices. All matrices contain lipid mixture: MilliQ water 1:1 (w/w).

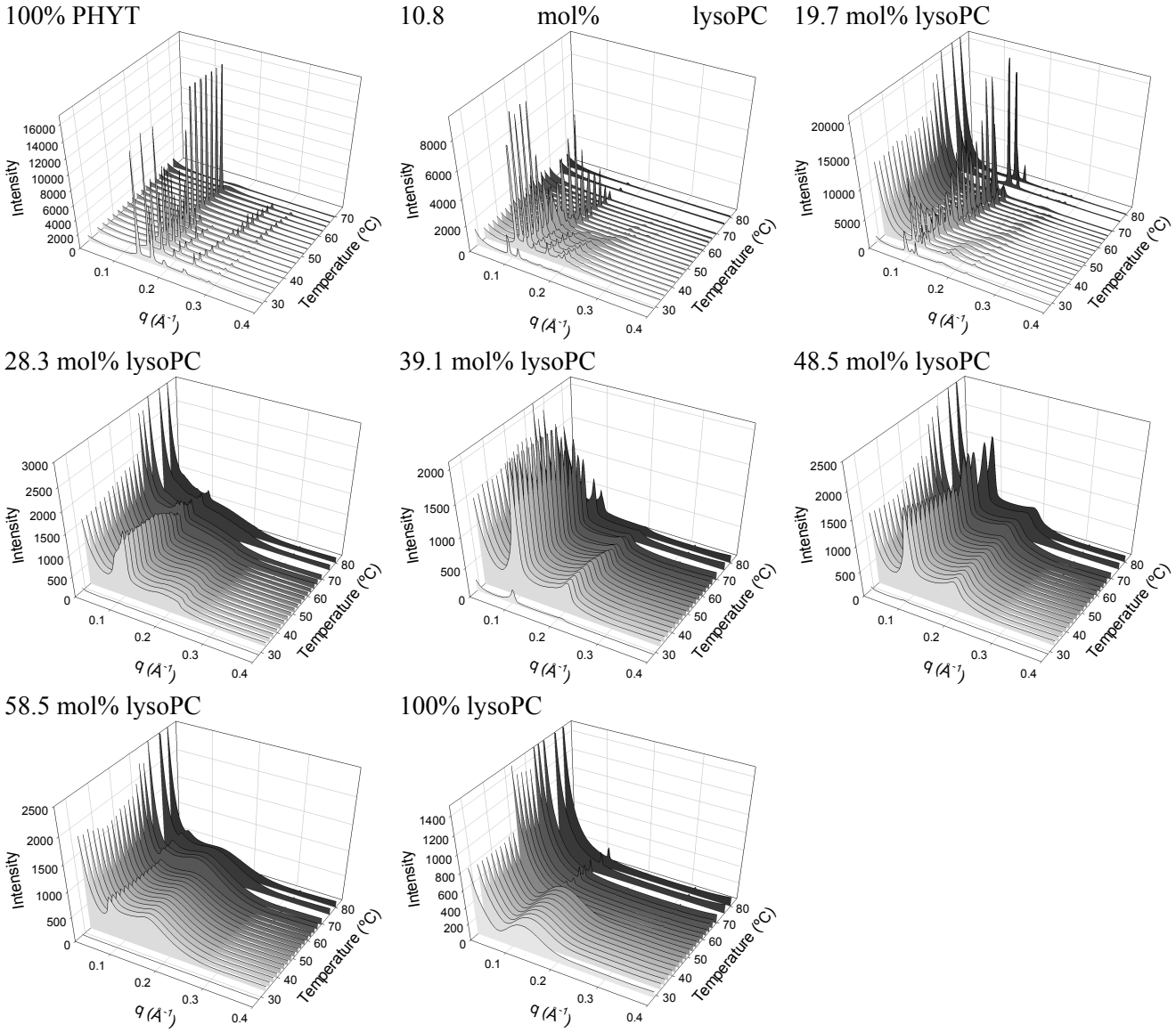


Figure SI5 – Equilibrium SAXS scattering patterns displaying the effect of increasing amounts of LysoPC added to the PHYT cubic phase as determined by SAXS. All matrices contained 50% water (w/w).

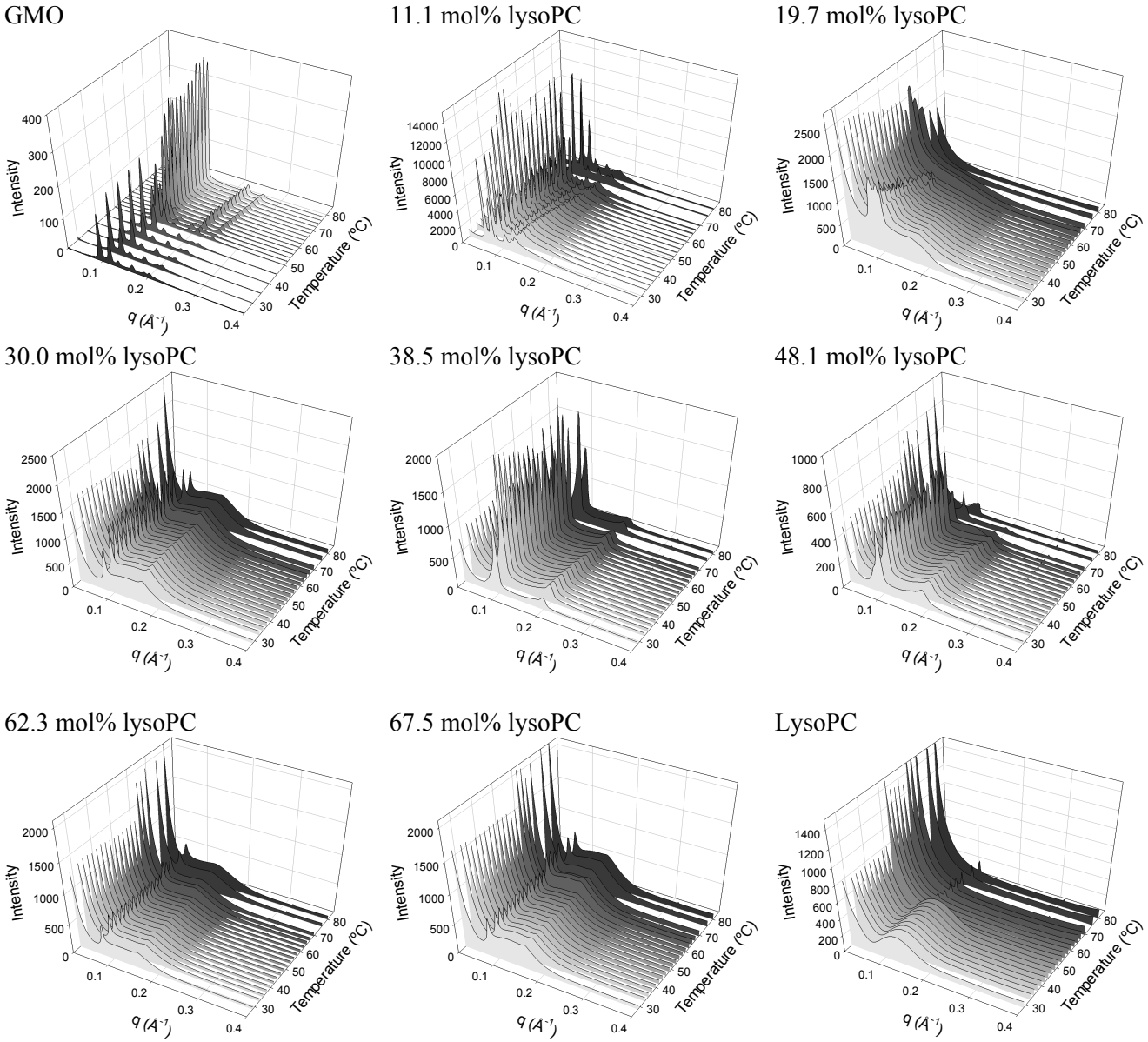
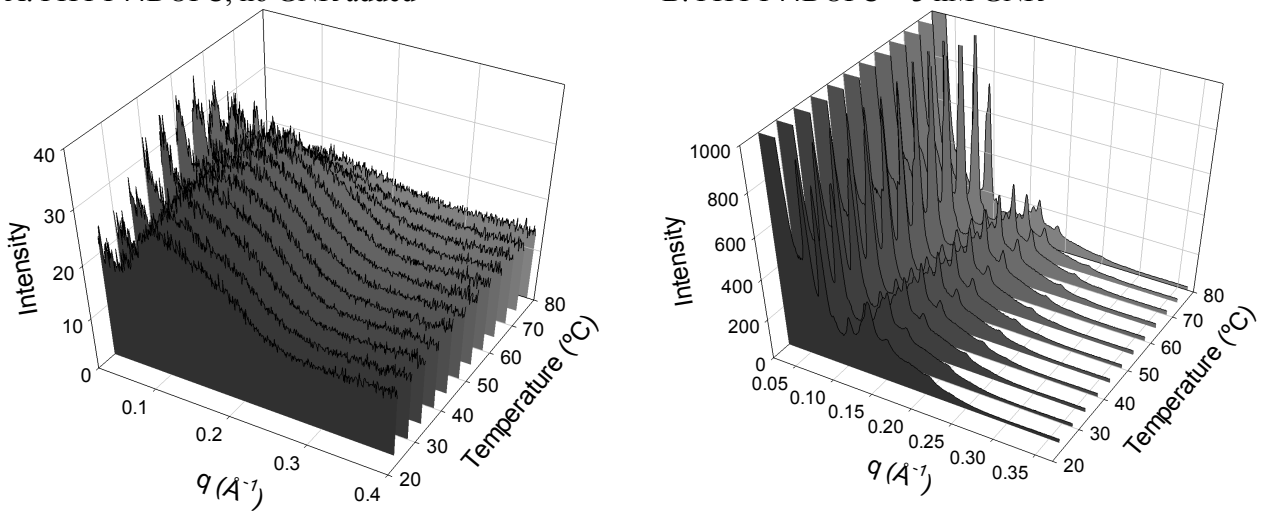


Figure SI6 – Equilibrium SAXS scattering patterns displaying the effect of increasing amounts of LysoPC on GMO as determined by SAXS. All matrices contained 50% water (w/w).

Equilibrium phase behaviour on heating

A. PHYT44DOPC, no GNR added

B. PHYT44DOPC + 3 nM GNR



Kinetic phase behaviour on irradiation

C. PHYT44DOPC

D. PHYT44DOPC-GNR

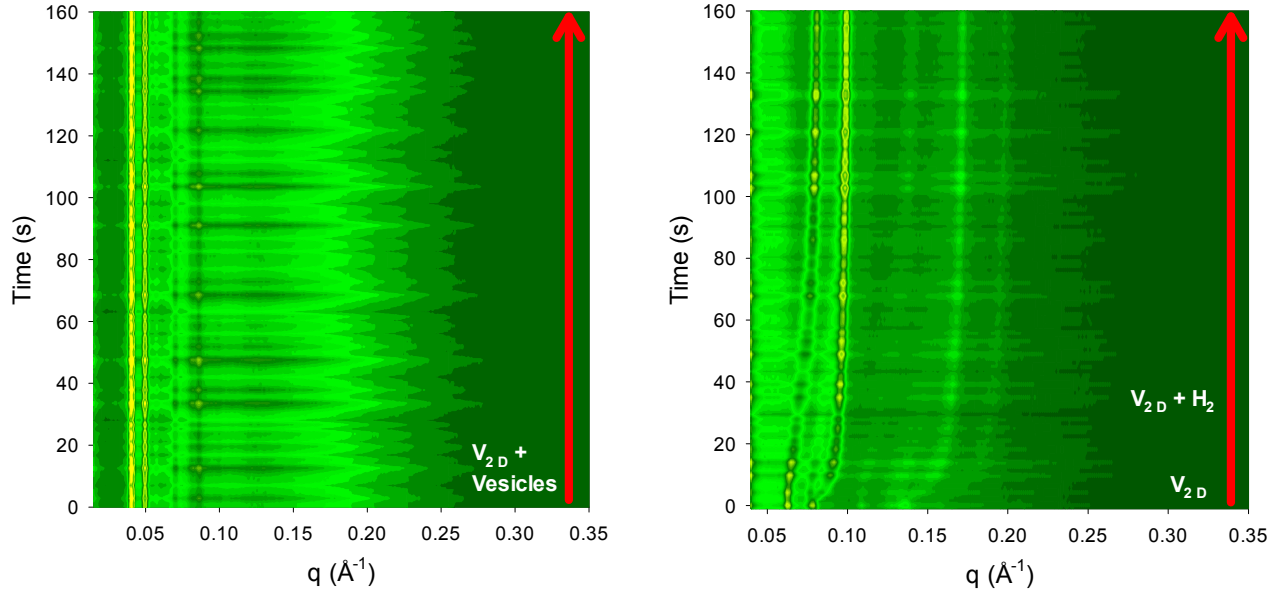


Figure SI7 – Panels A. and B.: The effect of GNR addition into the PHYT44DOPC matrix. SAXS profiles showing the equilibrium phase behaviour of Panel A. 44.4 mol% DOPC in PHYT (PHYT44DOPC) and Panel B. PHYT44DOPC + 3 nM GNR (PHYT44DOPC-GNR). Panels C. and D: Time resolved SAXS profiles showing the effect of laser irradiation (810 nm, 586 mW) on the phase behaviour of PHYT44DOPC (Panel C.) and PHYT44DOPC-GNR (Panel D.). The phase transitions are annotated on the right and were determined by integration of the individual frames. The red arrow indicates the duration of NIR irradiation (160 s). All matrices are in 50% water. The increased intensity of yellow is indicative of increased scattering.

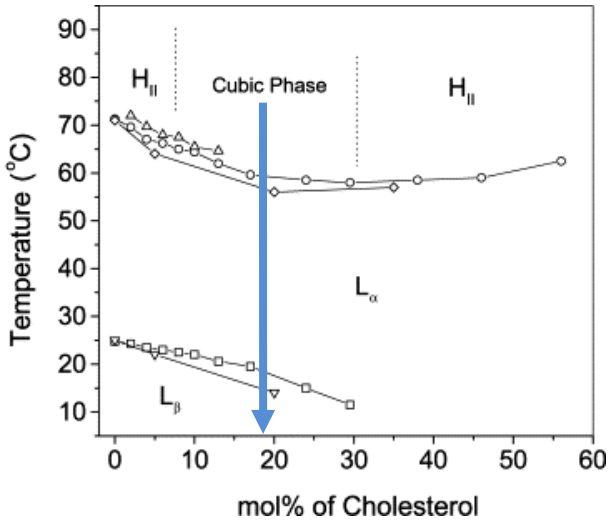


Figure SI8 – Partial phase diagram of aqueous dispersions of POPE and cholesterol. Symbols ▽ and □ indicate L_β to L_α phase transitions; ◇, ○ and △ indicate lamellar to non-lamellar phase transition. The blue arrow indicates the POPE/cholesterol formulation (20.1 mol% cholesterol) chosen for the photothermal SAXS study. Adapted from [1].

References

1. X. Wang and P. J. Quinn, *Biochimica et Biophysica Acta (BBA) - Biomembranes*, 2002, **1564**, 66-72.