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# Nanoparticles in lyotropic liquid crystals: the structural and rheological effects due to size and surface chemistry

Lamellar liquid crystals consisting of water, para-xylene, and Triton X-100 were formulated and were examined as silica nanoparticles of differing size and surface chemistry were doped in. The particles, regardless of size, were found to likely migrate to the liquid crystal domain boundaries, where they influence the structural and rheological properties of the mesophase. Consequently, phases with doped-in silica were not only found to be stiffer, but also had differing relaxation properties dependant on the type of silica nanoparticle present, and certain sizes and chemistries favoured the presence of a previously undiscovered mesophase in the phase diagram of the system. These results allow for a more comprehensive understanding of how liquid crystal systems act as solvents and host systems, which in turn allows for more sophisticated uses in catalysis, microfluidics, and protein crystallisation media.

## Topic

Soft Matter

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