Electronic Supplementary Information for Soft Matter manuscript:

**Phase Equilibrium and Structure Formation in Gold Nanoparticles – Nematic Liquid Crystals Composites: Experiments and Theory**

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This two figures shows the formation of the network structure for two cases, illustrating the weak network of low contrast branches for the case of 1%wt of NP-70 (Fig. S1), and a well defined network of high contrast branches for 15% of NP-49 (Fig. S2).

In addition, these figures clearly show that the nucleation rate depends on the type of nanoparticles and on the concentration of the dispersion

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**Fig. S1** POM micrographs under parallel polarizers, showing the isotropic to nematic phase transition, cooling at 1°C/min, for dispersions of 1% wt NP-70.

**Fig. S2** POM micrographs under parallel polarizers, showing the isotropic to nematic phase transition, cooling at 1°C/min, for dispersions of 15% wt NP-49.