

Biaxial phases in colloidal dispersions of goethite

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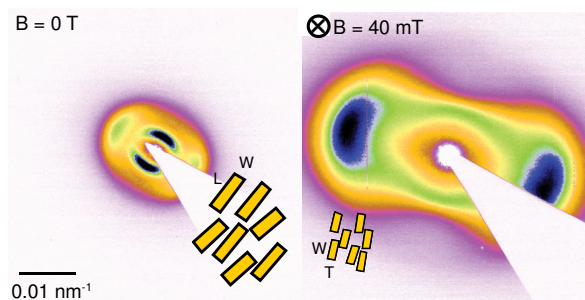
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Colloidal dispersions of goethite (α -FeOOH) contain boardlike crystallites (of volume $L \times W \times T$) which form nematic, smectic and columnar liquid crystals [1]. These goethite particles also display peculiar magnetic properties [2] combining a considerable permanent magnetic moment along their length (L) with an induced magnetic moment along the shortest particle dimension (T). Therefore, particles align parallel to a small external magnetic field but perpendicular to a large magnetic field.

We here present a goethite dispersion, for which $L/W \approx W/T$, so that a biaxial nematic phase might be expected. Small Angle X-ray Scattering (SAXS) measurements revealed that both a biaxial nematic and smectic phase are observed in this system. The biaxial phases could be aligned in different directions by applying a very small magnetic field which allowed us to construct a complete picture of the biaxial phases.

References

- (1) G. J. Vroege, D. M. E. Thies-Weesie, A. V. Petukhov, B. J. Lemaire, P. Davidson *Adv. Mater.* **2006**, *18*, 2565
- (2) B. J. Lemaire, P. Davidson, J. Ferré, J. P. Jamet, P. Panine, I. Dozov, J. P. Jolivet *Phys. Rev. Lett.* **2002**, *88*, 125507



SAXS patterns of a biaxial nematic phase in zero field and in a 40 mT field directed into the paper.