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Freeze-fracture TEM Observation of Magnetic Platelets in Colloidal Suspensions in Liquid Crystals[1] MIN SHUAI, ARTHUR KLITTNICK, RENFAN SHAO, JOSEPH MACLENNAN, MATTHEW GLASER, NOEL CLARK, Department of Physics and Liquid Crystal Materials Research Center, University of Colorado - Boulder, ROLFE PETSCHEK, Physics Department, Case Western Reserve University — Ferromagnetic liquid crystals have recently been realized in a colloidal system of magnetic nanoplatelets in nematic liquid crystals [A Mertelj, *et al*, 12$^{\text{th}}$ European Conference on Liquid Crystals, Greece, 2013]. Here, using freeze-fracture transmission electron microscopy (FFTEM), direct observation of the organization of the nanoplatelets in the liquid crystal phases is achieved. Macroscopic nematic ordering of the nanoplatelets is found in their colloidal suspensions in nematic liquid crystals at particle concentration as low as 0.2% by volume without the present of external magnetic field. The arrangement of the platelets in the isotropic liquid crystals with and without external magnetic field is also studied. Modeling on the interactions of magnetic nanoplatelets is provided.

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Min Shuai
Department of Physics and Liquid Crystal Materials Research Center,
University of Colorado - Boulder

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