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Interaction and Response of a Smectic-A liquid crystal to a 2 nm Nanometer Particle: Phase transition due to the Functionalization Compound LUZ J MARTINEZ-MIRANDA, University of Maryland, LYNN K KURIHARA, Naval Research Laboratories — We have studied the in-plane (parallel to the magnetic field) alignment of 8CB mixed with FeCo nanoparticles covered with different funtionalization compounds. The functionalization compounds are Polyethelene glycol (PEG (3000)), hydroxyl succinimide (NHS), aminopropyl triethoxy silane (APTS) and mercapto hexa-decanoic acid (MHDA). We have studied them using X-ray scattering. We have found that the inverse integrated intensity of the X-ray scans in the plane of the magnetic field is a good measure of how much energy the system (liquid crystal, nanoparticles, functionalization compound) will need to reorient the liquid crystal in the magnetic field. In addition, we have observed that the orientation the liquid crystal adopts with respect to the nanoparticles can result in a phase transition that takes the liquid crystal to a more disordered and symmetric phase that favors the rotation, as happens in the smectic-nematic transition, observed in the sample with APTS. We relate the disordering to the changes observed in the transition for the liquid crystal and this termination to recent heat capacity measurements by Cordoyiannis et al. [1]. **References** [1] Cordoyiannis, G., Kurihara, L.K., Martinez-Miranda, L. J, Glorieux, C., Thoen, J., submitted to PRE (2008).

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