Calorimetric study of aligned liquid crystal + aerosil\textsuperscript{1} F. CRUCEANU, G. S. IANNACCHIONE, Worcester Polytechnic Institute, D. LIANG, R. L. LEHENY, Johns Hopkins University — A high-resolution ac-calorimetric study was performed on magnetically aligned colloidal dispersions of 8CB and aerosil spanning the weakly first-order \textit{I}-\textit{N} and second order \textit{N}-SmA phase transitions. Stable aligned samples were prepared by repeated cycling between the isotropic and nematic phase in the presence of a 2 T magnetic field. Zero-field measurements were carried out on six aligned conjugate density samples ranging from 0.03 to 0.15 g cm\textsuperscript{−3} (mass of aerosil per volume of liquid crystal). For comparison, two unaligned samples from the same batch (0.05 and 0.13 g cm\textsuperscript{−3}) were also studied. The unaligned samples reproduce very closely previous studies on this system. The magnetically aligned samples, exhibits lower transition temperatures for the same aerosil density sample and a shift to higher aerosil density of the non-monotonic $T_c$ evolution. The clear differences between aligned and unaligned sample indicate the “memory” of the magnetic field even after heating deep into the isotropic phase. The origin of this “memory” remains unexplained.

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