Supporting information

Laser triggered phase transition in photothermal liquid crystals
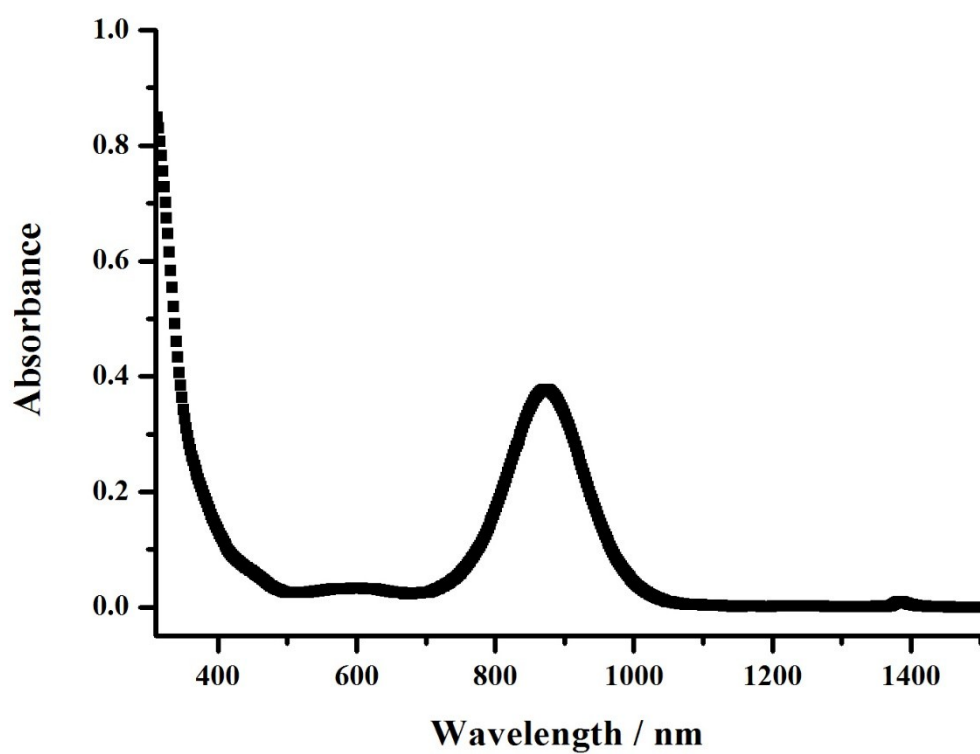
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Compound **1**[1] and compound **2**[2] were synthesized as previously described. Optical microscopy investigations were performed on a Nikon H600L polarising microscope equipped with a Linkam "liquid crystal pro system" hotstage. Laser irradiation on solution or on thin films were performed with a 940 nm-wavelength semiconductor laser (BWT Beijing LTD). The power intensity of the laser could be adjusted externally (0-10 W). The output power was independently calibrated using an optical power meter. In solution, the temperature profiles were recorded thank to a thermocouple with an accuracy of ± 0.1 °C connected to an Agilent U1253B multimeter. The thermocouple was inserted into the solution at such a position that the direct irradiation of the laser was avoided. The temperature was measured every 1s. Temperature elevations on thin films were directly recorded with a thermal infrared camera (OPTRIS PI400) and the PI Connect software. UV-Vis-NIR absorption spectra in solution were recorded on a Shimadzu UV3600 Plus spectrophotometer. Samples were placed in 1 cm path length quartz cuvettes. The thickness of the films have been determined with a Taylor-Hobson Talystep surface profilometer after gentle removing of the cover-glass slide at room temperature.
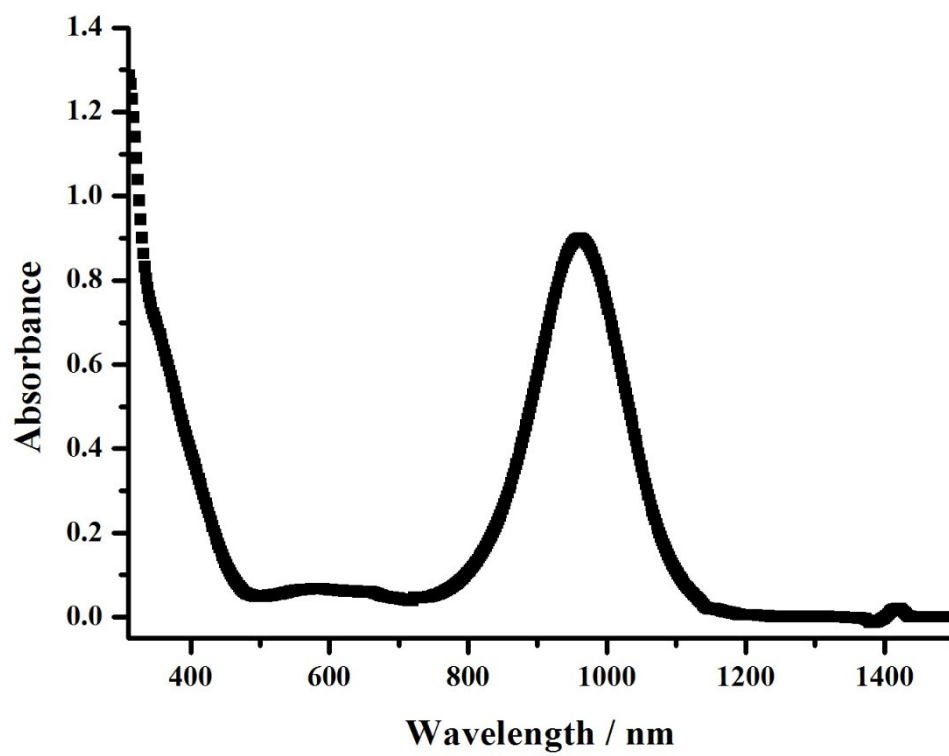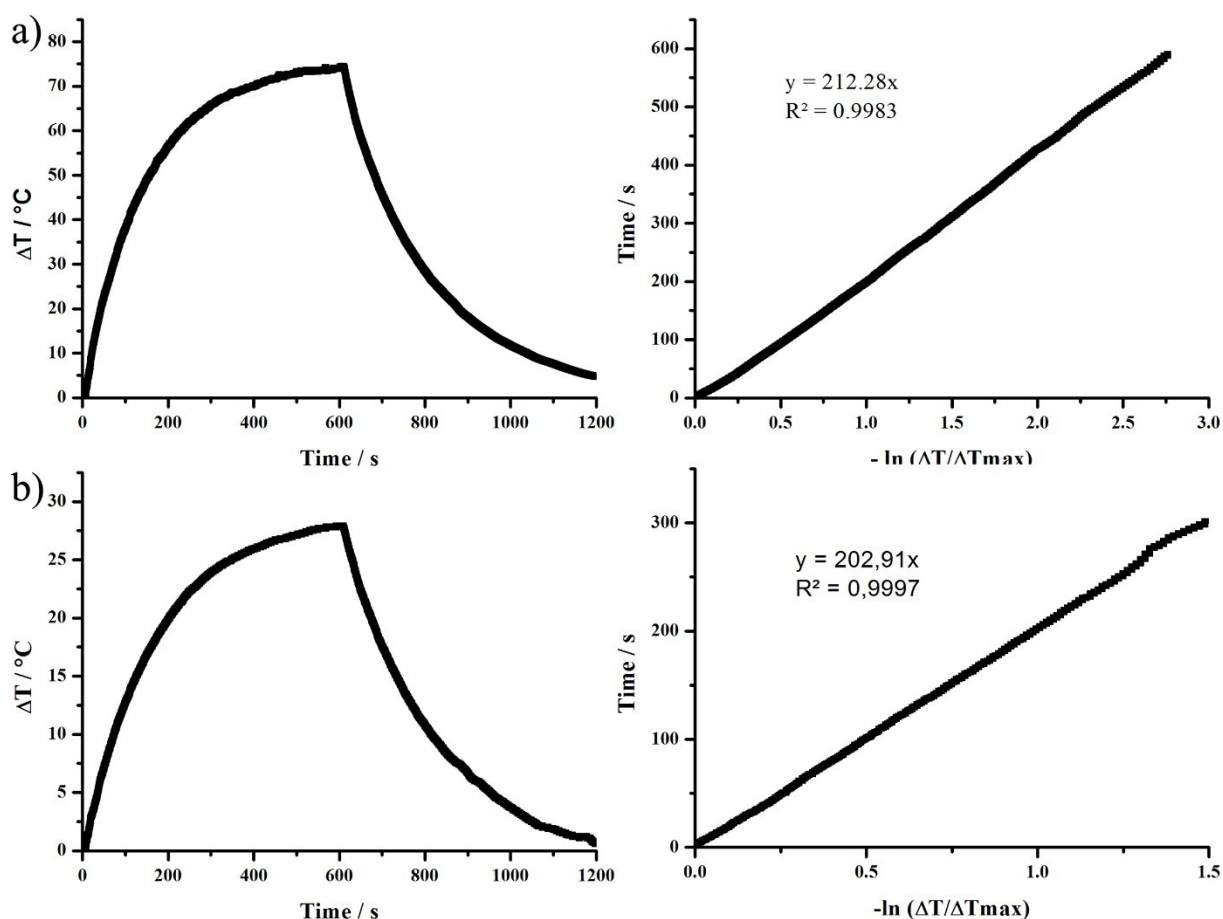
Figure S1. UV-vis-NIR absorption spectrum of compound **1** in toluene (C = 2.5x10^{-5} mol.L^{-1})

**Figure S2.** UV-vis-NIR absorption spectrum of compound **2** in toluene (C = 1.2 x10^{-5} mol.L^{-1})

Figure S3. a) (Left) Temperature profile of the suspension of compound **1** in toluene (C = 2.5×10^{-5} mol.L^{-1}) when illuminated with a 940 nm laser (5 W.cm^{-2}) during 10 min and after turning off of the laser during 10 min; (Right) time constant for heat transfer is determined by applying the linear time from the cooling period (from 600 to 1200 s) versus negative natural logarithm of the driving force temperature. b) (Left) Temperature profile of the suspension of compound **2** in toluene (C = 1.2×10^{-5} mol.L^{-1}) when illuminated with a 940 nm laser (5 W.cm^{-2}) during 10 min and after turning off of the laser during 10 min; (Right) time constant for heat transfer is determined by applying the linear time from the cooling period (from 600 to 1200 s) versus negative natural logarithm of the driving force temperature.
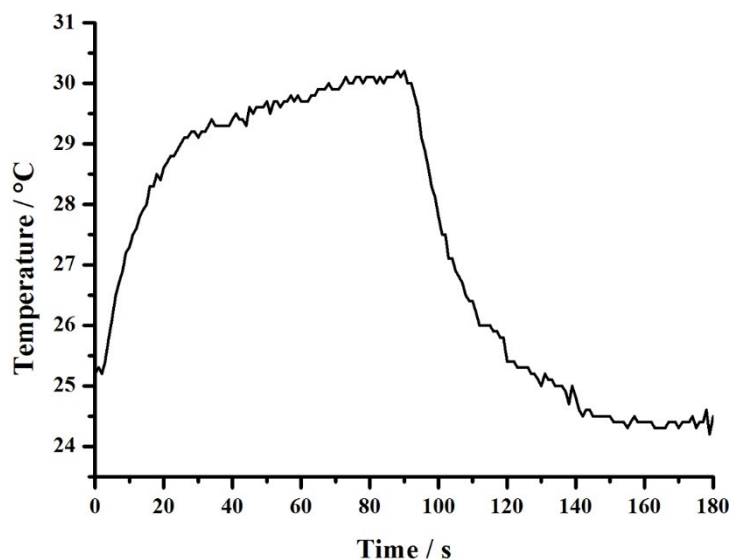
Figure S4. Temperature profile of the glass support without nickel-bis(dithiolene) complexes irradiated at 940 nm with a laser density of 2.5 $W.cm^{-2}$ for 90 s.
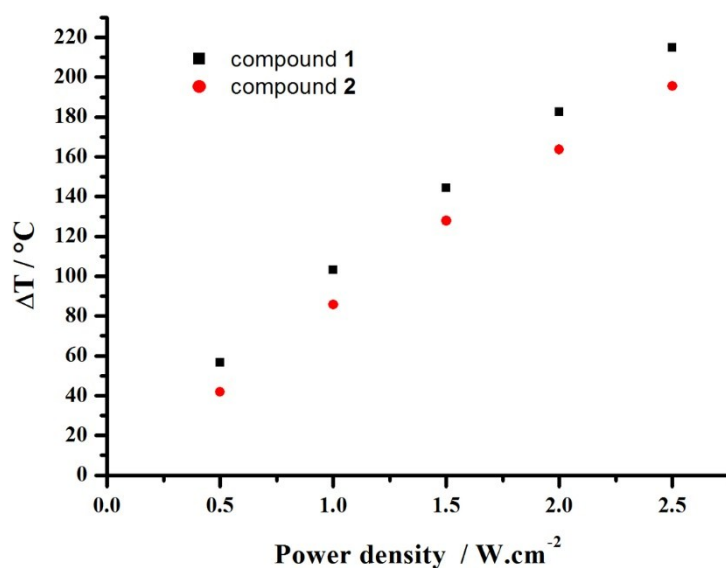
Figure S5. Evolution of the maximum temperature increase (ΔT) as a function of the power density (measurements performed on thin films).

Cycle	Room Temperature	Laser ON	Laser OFF	Thermal annealing (110 °C)
1				
2				
3				
4				
5				
6				
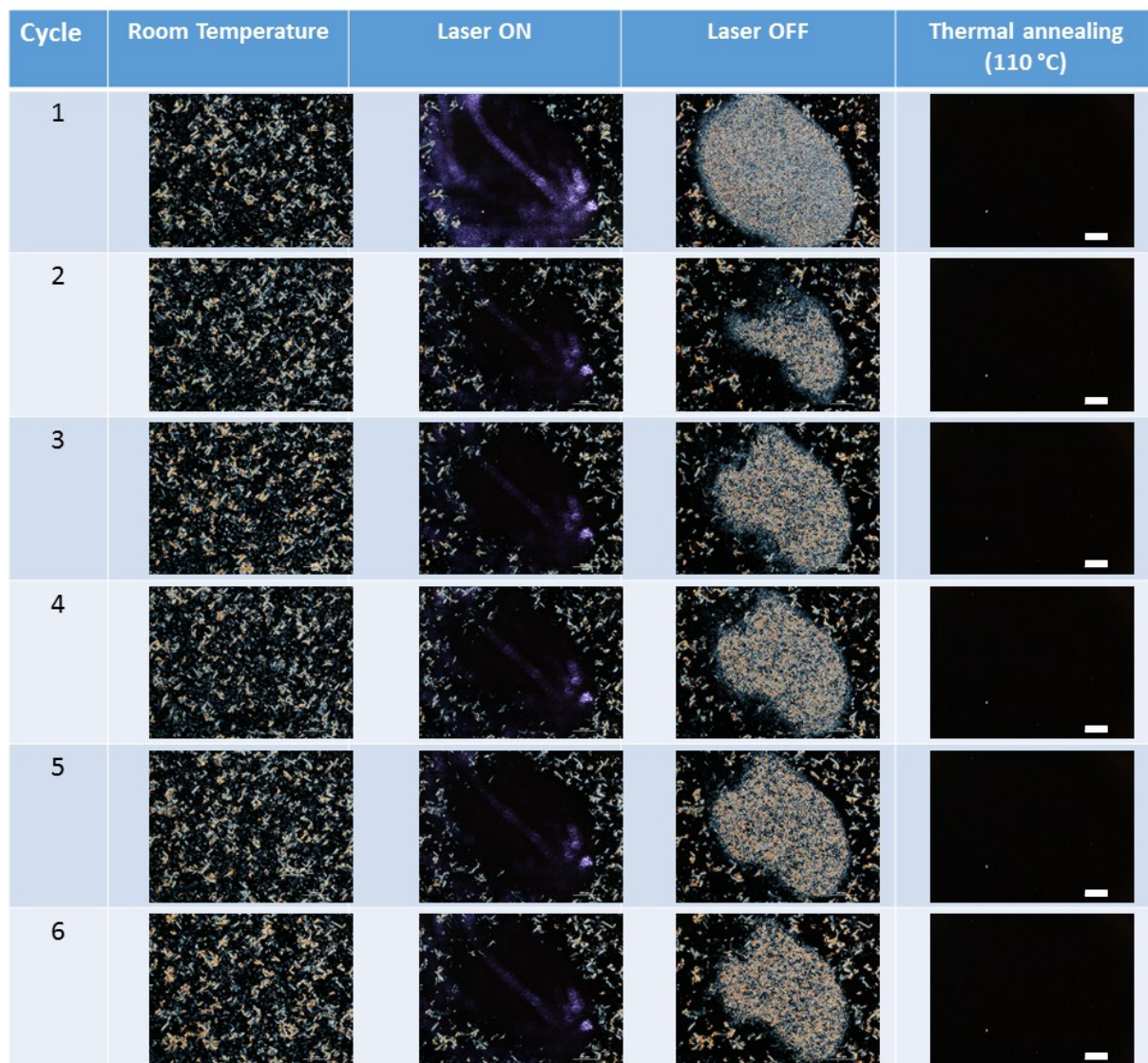
Figure S6. Writing (laser irradiation) and erasing (thermal annealing) cycles performed on the same area (scale bar = 200 μm). The purple reflect is due to the reflexion on the laser on the glass cover slide. Thermal annealing was performed at 10 °C/min and after heating at 110 °C, the compound was cooling down to room temperature.

[1] K. Ohta, Y. Inagaki-Oka, H. Hasebe and I. Yamamoto, *Polyhedron*, 2000, **19**, 267–274.
[2] S. Debnath, H. F. Srour, B. Donnio, Marc Fourmigue and F. Camerel, *RSC Adv.*, 2012, **2**, 4453-4462.