Molten Fatty Acid Based Microemulsions
– Supporting Informations –

Cecile Noirjean, Fabienne Testard, Christophe Dejugnat, Jacques Jestin, David Carriere

In the Supporting information, you will find whole DSC curves of anisotropic samples from which only the heating part is shown in the main text. The infrared spectra, in the carbonyl range (1800 - 1600 cm^{-1}), of the same samples at different temperature between 25°C and 80°C demonstrate that each thermal transition is associated with a change in the molecular interactions of the carbonyl part of myristic acid. Finally, a table presents the parameters from the linear fitting of calorimetric data shown in the main text.

1 Whole DSC curves of anisotropic samples

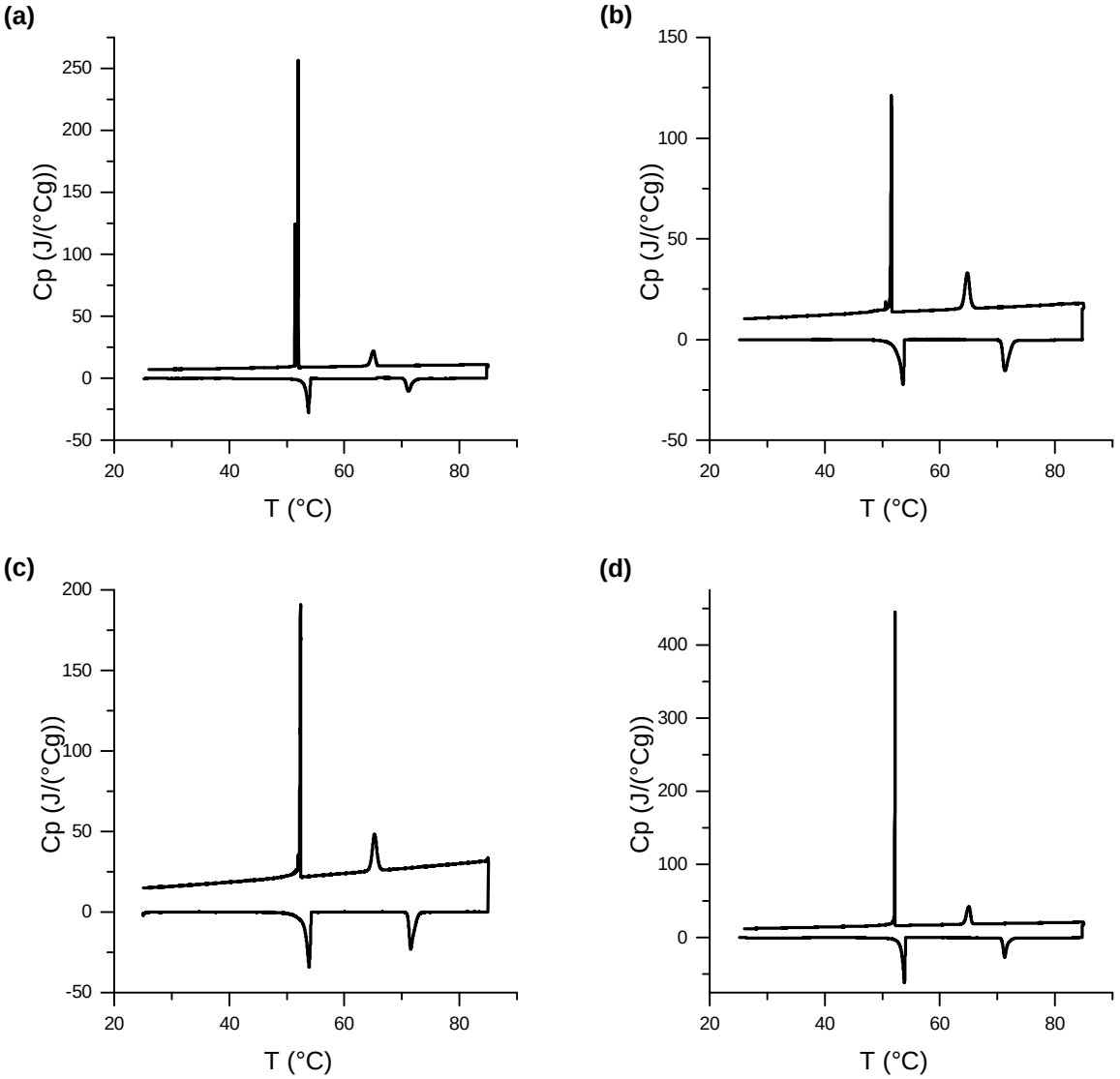

Figure 1: *DSC curves of anisotropic samples: heating and cooling at 0.1°C/min (a) L_a (lamellar sample) (b) L_b (lamellar sample) (c) H_a (reverse hexagonal sample) (d) H_b (reverse hexagonal sample)*

2 Infra-red curves in the C=O range of anisotropic samples

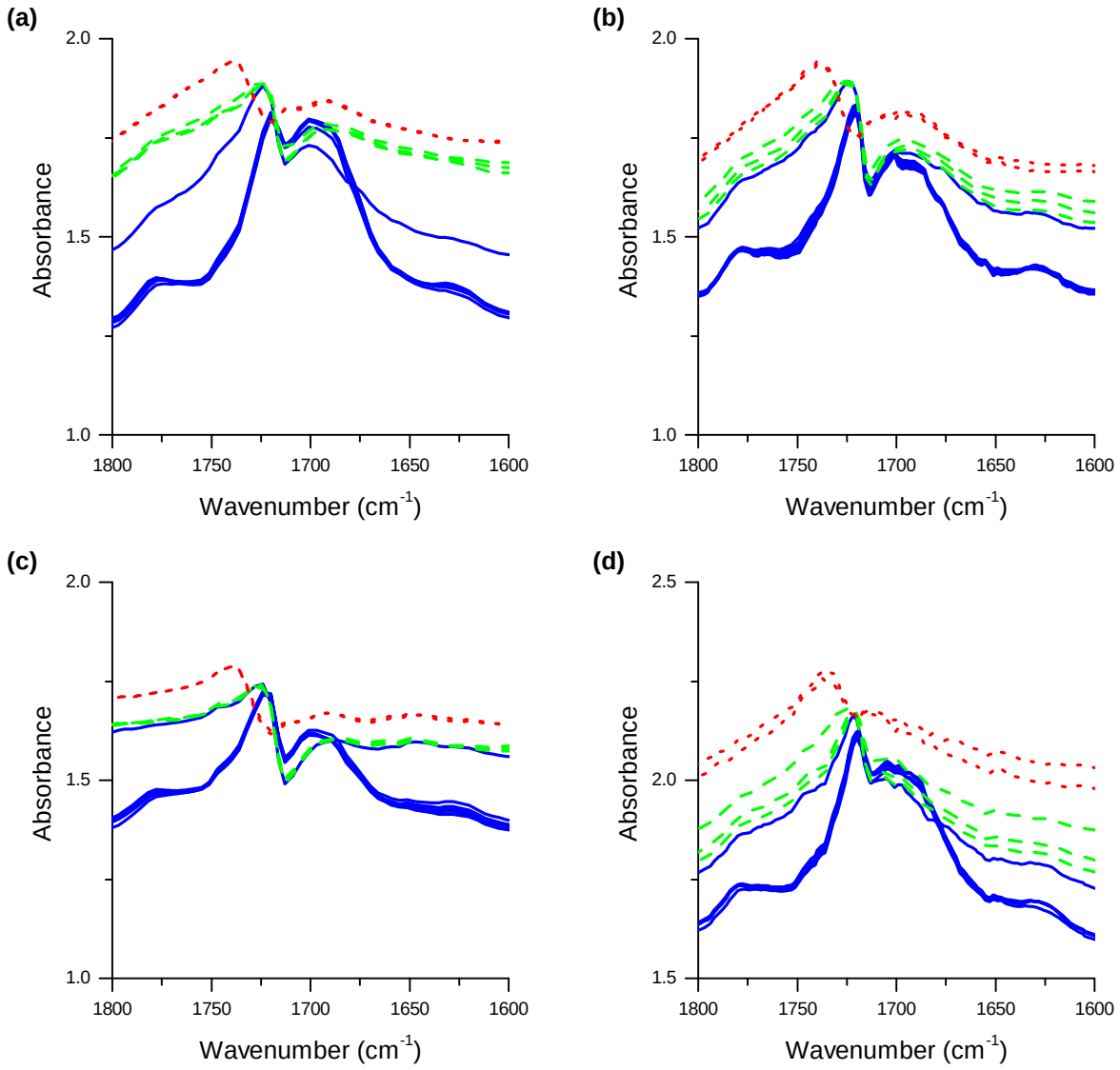

Figure 2: *Infra-red study of anisotropic samples in the carbonyl C=O stretching vibration range at different temperatures (straight lines: 25-50°C, dashed lines: 55-70°C and dotted lines: 75-80°C). (a) L_a (lamellar sample) (b) L_b (lamellar sample) (c) H_a (reverse hexagonal sample) (d) H_b (reverse hexagonal sample)*

We retrieve on these curves a similar behaviour as what was observed on the infrared spectra of the MA/CTAB/water = 70/19/11 weight% mixture as a function of temperature [Noirjean et al., *Soft Matter*, 2014, **10**, 5928].

For each sample, three sets of curves are observed (highlighted by different colors in Figure 2). The transition from one set to another is well correlated with thermal transitions seen in DSC experiments. Below 50°C, two characteristic peaks are visible, one is assigned to the myristic acid dimers (1689 cm^{-1} and 1701 cm^{-1}) and the other to a MA/CTAB complex (1724 cm^{-1}). Between 55°C and 70°C, the intensities of these two peaks are modified with a slight transition of the second one towards higher wave numbers. Finally, above 70°C, the intensity of the band at 1724 cm^{-1} decreases strongly, whereas

vibrations at 1709 cm^{-1} and at higher wavenumbers appear (1736 cm^{-1} and above). The second phase transition, at 70°C, is therefore assigned to the weakening of the interactions with the carbonyl moieties in the mixed CTA/MA interfacial film.

3 Parameters from linear fitting of calorimetric data

T	**X**	**a**	**b**	$\mathbf{R^2}$
52°C	MA	1.01 ± 0.04	0.01 ± 0.02	0.9949
70°C	CTABMA	1.05 ± 0.1	0.01 ± 0.05	0.9761

Table 1: *Parameters from linear fitting of calorimetric data (Figure* **??** *in the main text):* $\frac{\Delta H_T}{\Delta H_X} = a \cdot f_m(X) + b$ *where T is the transition temperature and X is the corresponding species*