Supplementary Information

Influence of Particle Orientation, Concentration and Matrix Stiffness on the Elastocaloric Performance of Spin Crossover Composite Materials

Nagham Mawassy, Adelais Trapali , Vincent Collière, Lionel Salmon, Gábor Molnár* and Azzedine Bousseksou*

LCC, CNRS & University of Toulouse, 205 route de Narbonne, 31077 Toulouse, France

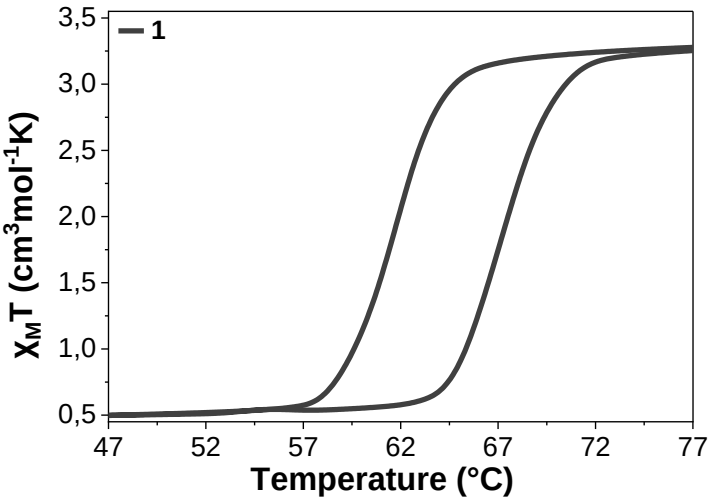


*Figure S1: Temperature dependence of the molar magnetic susceptibility*temperature product ($\chi_M T$) for the SCO particles (**1**).*

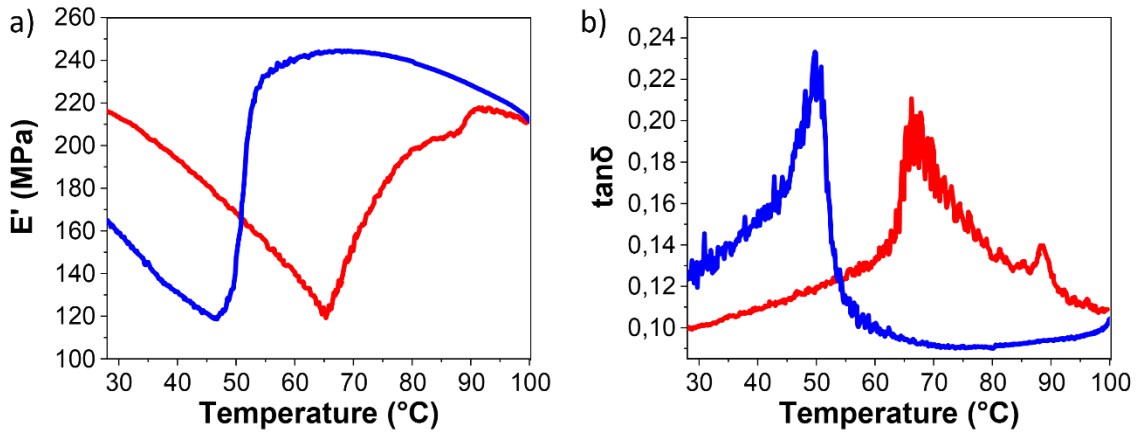


*Figure S2: DMA characterization of **1**@50%TPU70A$^{//}$: a) Storage modulus and b) loss tangent measured as a function of the temperature upon heating (red) and cooling (blue).*

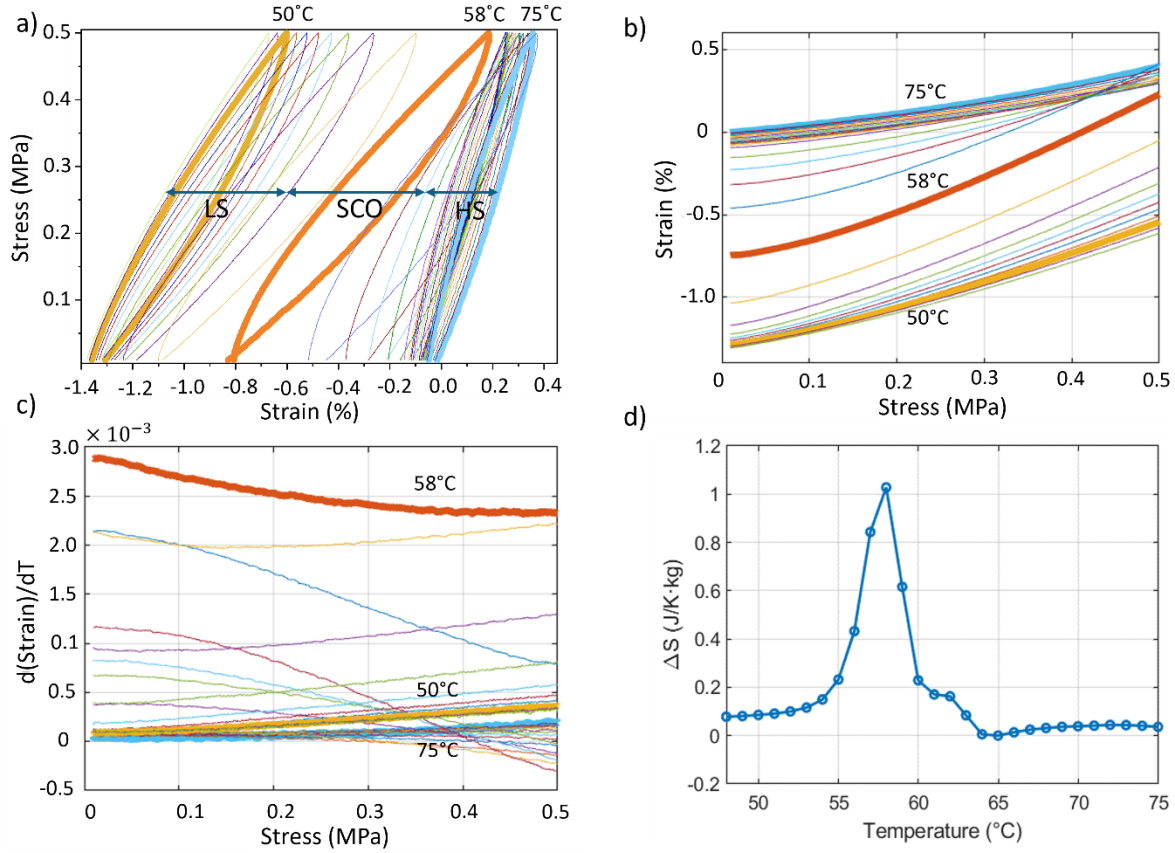


*Figure S3: (a) Stress–strain curves under loading and unloading at various temperatures for the **1**@50%TPU70A// sample. (b) Strain vs. stress curves corresponding to stretching in (a). (c) The differential of strain with respect to temperature vs. stress. (d) Entropy change (ΔS) induced by 0.5 MPa stress at isothermal conditions on the sample upon cooling.*

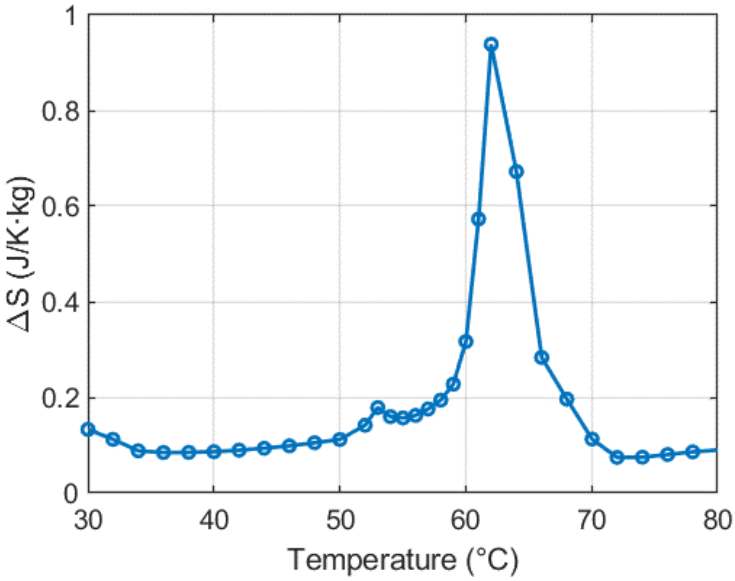
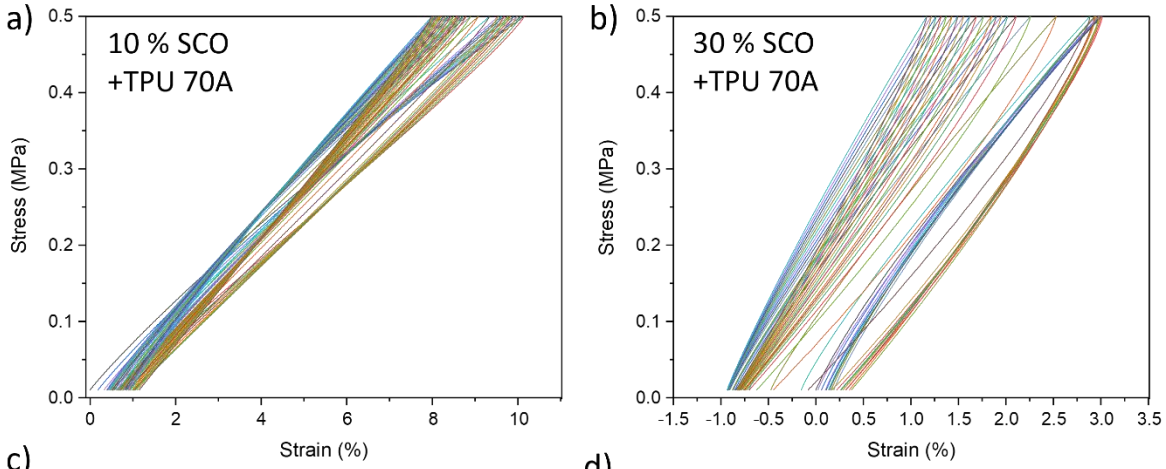
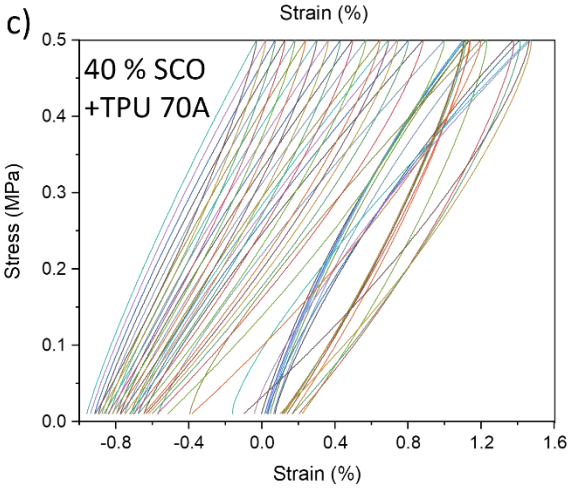
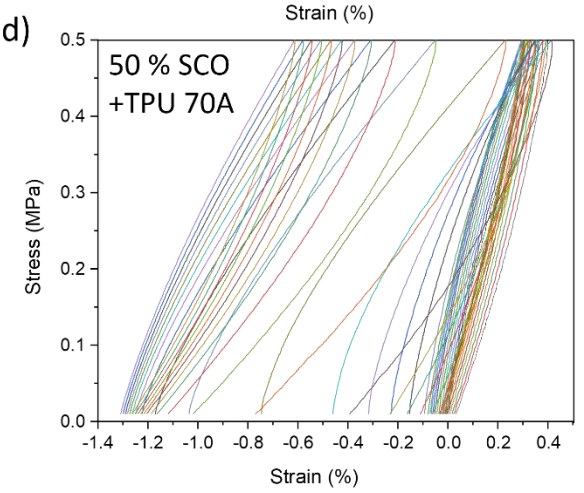


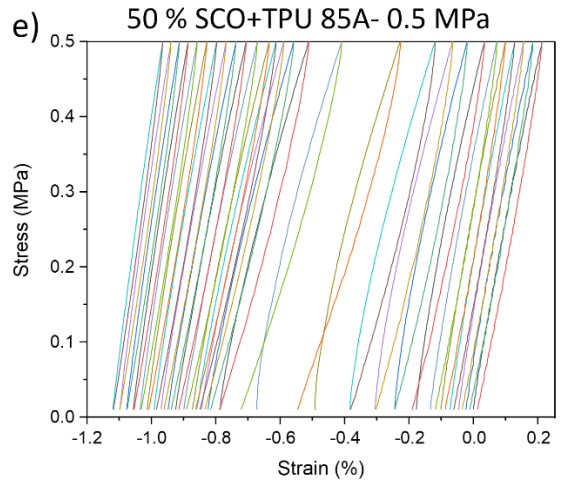
Figure S4: Entropy change induced by stress at isothermal conditions for the heating branch of 1@50%TPU 70A from 30 °C till 80 °C.

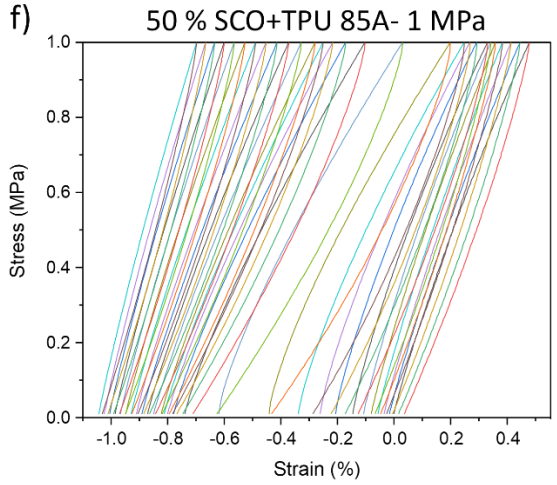

a)
10 % SCO
+TPU 70A
Stress (MPa)
Strain (%)

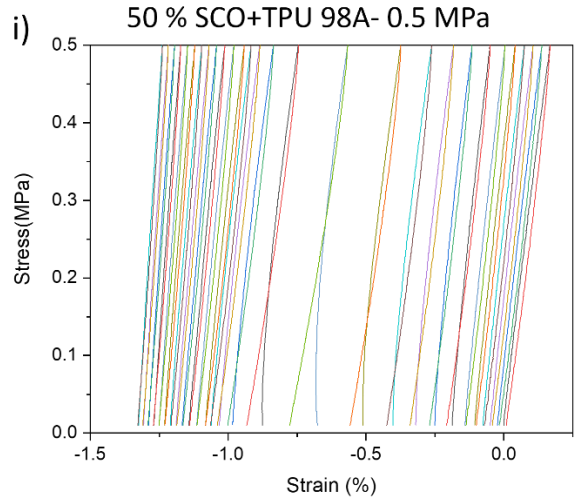
b)
30 % SCO
+TPU 70A
Stress (MPa)
Strain (%)

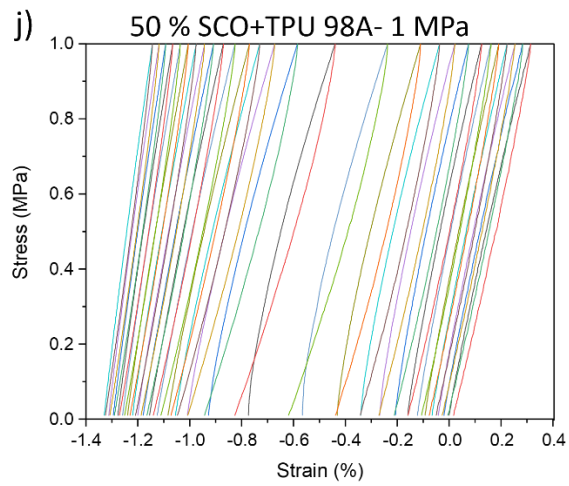

c)
40 % SCO
+TPU 70A
Stress (MPa)
Strain (%)


d)
50 % SCO
+TPU 70A
Stress (MPa)
Strain (%)


e)
50 % SCO+TPU 85A- 0.5 MPa
Stress (MPa)
Strain (%)


f)
50 % SCO+TPU 85A- 1 MPa
Stress (MPa)
Strain (%)


i)
50 % SCO+TPU 98A- 0.5 MPa
Stress(MPa)
Strain (%)


j)
50 % SCO+TPU 98A- 1 MPa
Stress (MPa)
Strain (%)

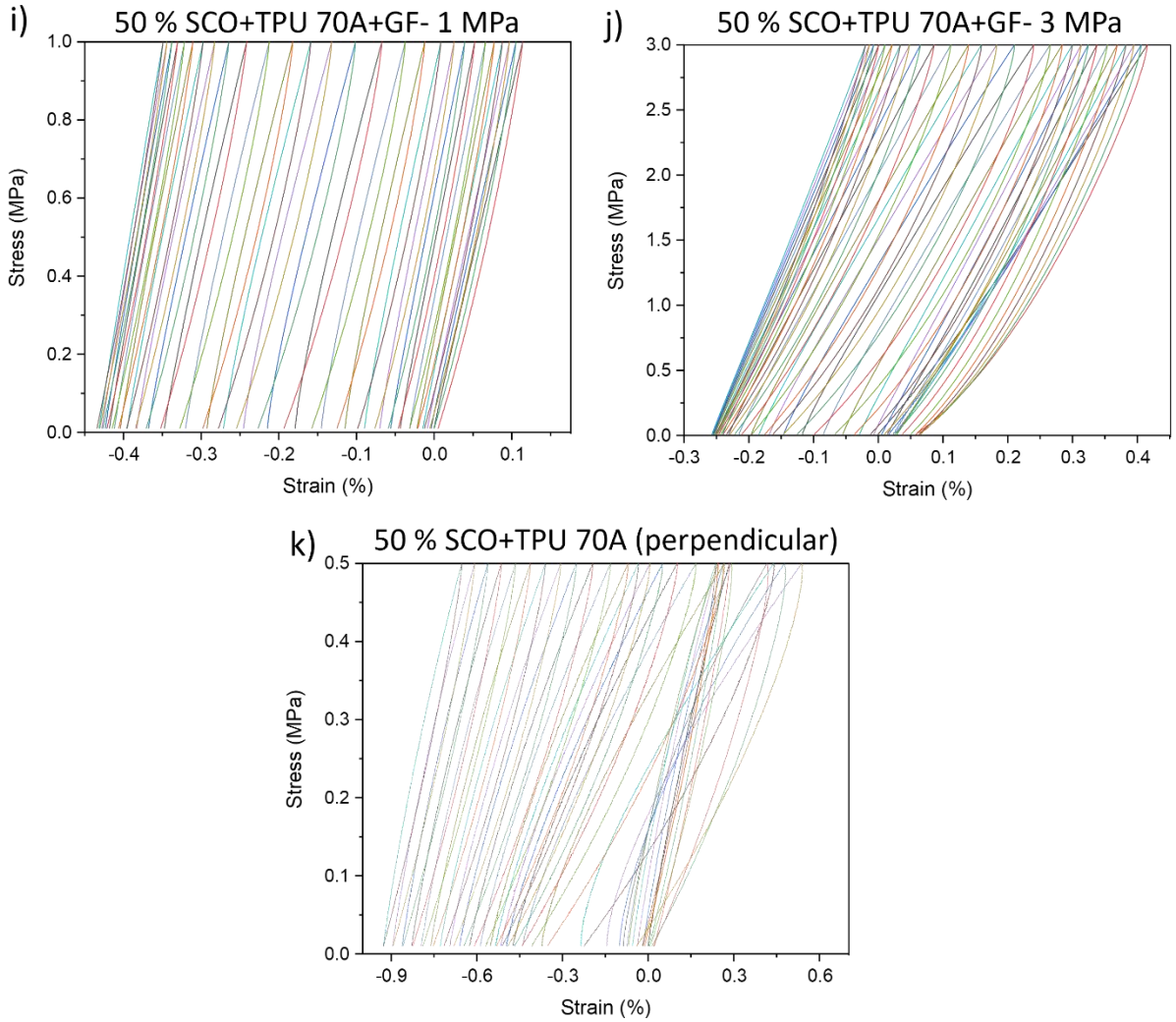


Figure S5: Stress-strain curves of the different samples mentioned in Table 1 and Table 2 in the manuscript calculated with respect to the reference length at 75°C.

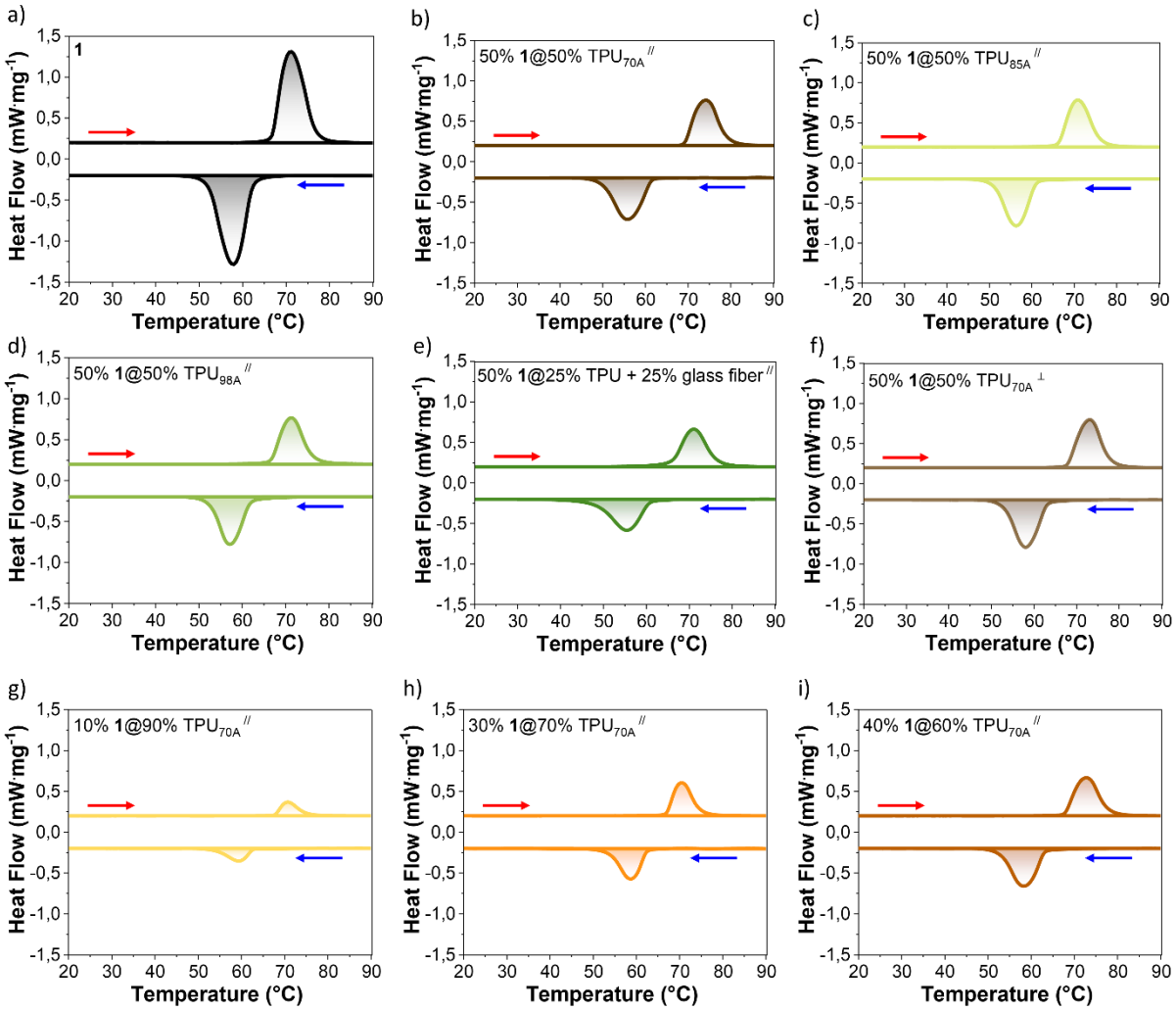


Figure S6: DSC curves of the different samples mentioned in Table 1 and Table 2 in the manuscript.