Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

A comparative study of the mechanical, shape-memory, and degradation properties of poly(lactic acid) nanofibers and cellulose nanocrystals reinforced Poly(mannitol sebacate) nanocomposites

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1. Scanning electron microscopy

The morphology of PMS/NF-PLA nanocomposites was studied by scanning electron microscopy (SEM). **Figure S1** shows representative SEM images for the cross-section of PMS nanocomposites with 4 and 10 wt% of PLA nanofiber contents.

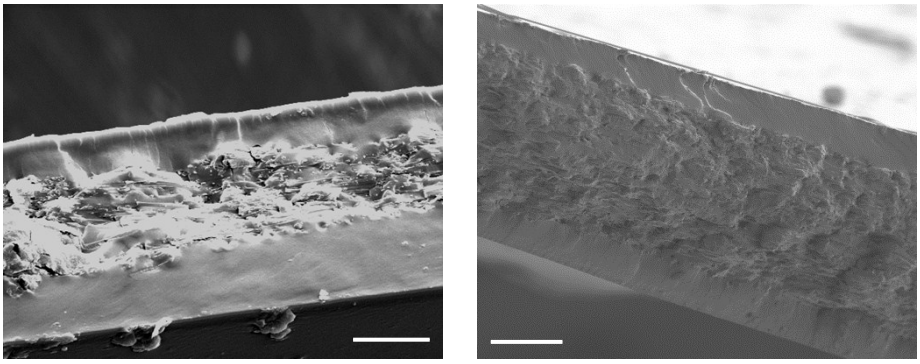

Figure S1. Left to right, cross-sectional SEM for PMS/NFPLA 4 wt% and 10 wt% nanocomposites (scale bars 20 μm).

2. Differential scanning calorimetry

The thermal behavior for PMS/NF-PLA nanocomposites was studied in a Mettler-Toledo DSC 800 under N_2 atmosphere. Samples were heated from -60 to 180 °C, cooled down to -60 °C and heated again to 180 °C at a heating/cooling rate of 10 °C/min under an N_2 atmosphere. **Figure S2a** evidences a melting peak in the PMS/NF-PLA samples due to the infiltration of the PLA mats. Glass transition temperature of the PLA at 65 °C is clearly evident for the nanocomposite with 15 wt% of nanofibers.

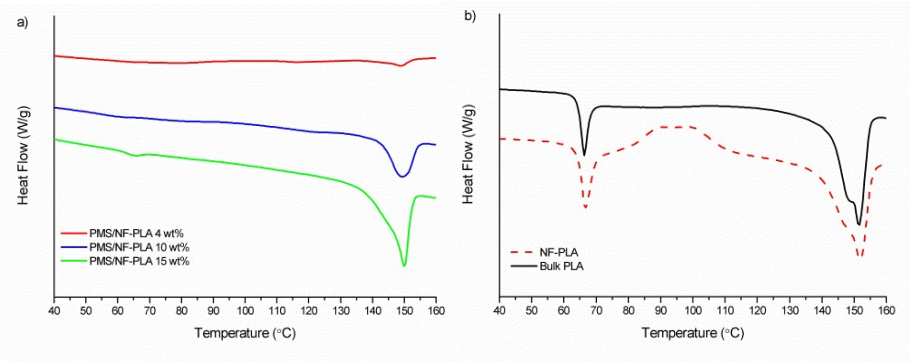

Figure S2. First heating run thermograms for PMS/NF-PLA nanocomposites **(a)**, and for electrospun PLA nanofibers and bulk PLA **(b).**

3. Dynamic Mechanical Thermal Analysis (DMTA)

Figure S3 shows Tan Delta peaks for PMS/CNC and PMS/NF-PLA nanocomposites evidencing a second peak in the nanofiber nanocomposites due to the NF-PLA presence.

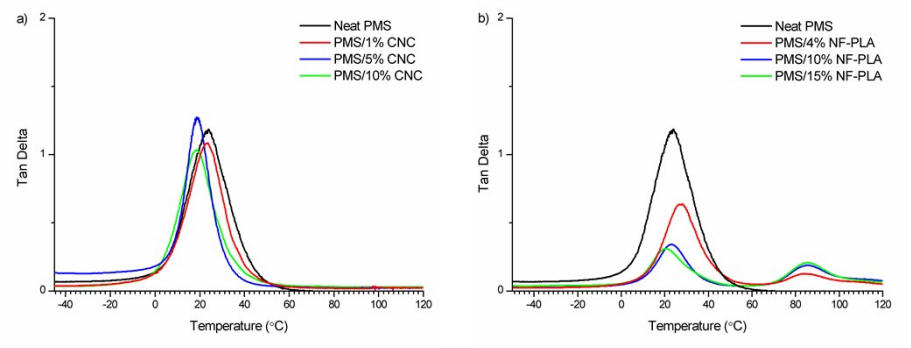

Figure S3. DMTA delta tangent curves as a function of temperature for neat PMS and PMS/CNC nanocomposites **(a)** and neat PMS and PMS/NF-PLA nanocomposites **(b)**.

4. Thermally Activated Shape-Memory Properties

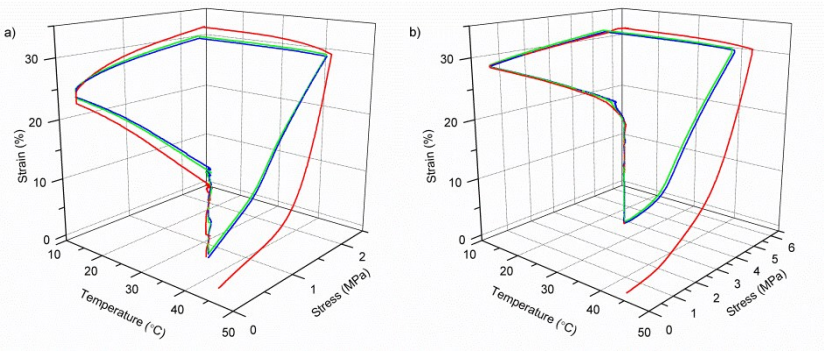

Figure S4. Shape-memory stress-strain-temperature curves of consecutive cycles for; PMS/NF-PLA 4 wt% nanocomposite **(a)** and PMS/NF-PLA 15 wt% nanocomposite **(b)**.