

A Feasibility Study of Processing Polydimethylsiloxane–Sodium Carboxymethylcellulose Composites by a Low-Cost Fused Deposition Modeling 3D Printer

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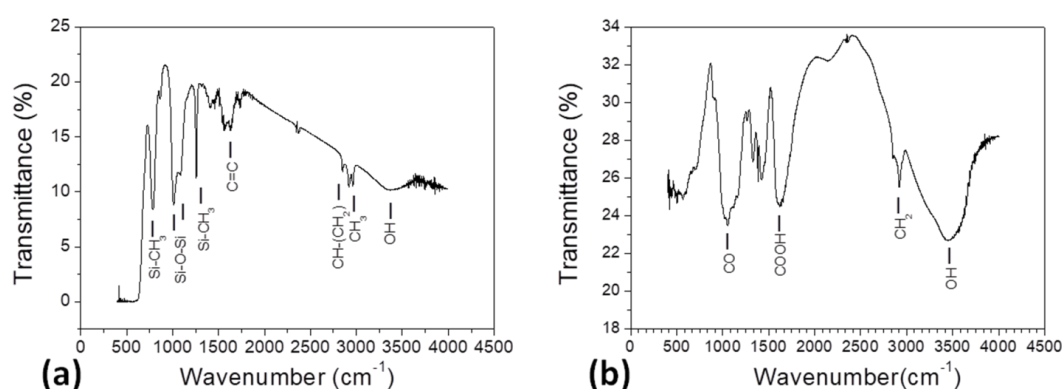


Figure S1. FTIR characterization performed on (a) PDMS and (b) Na-CMC powder, with specified typical peaks.

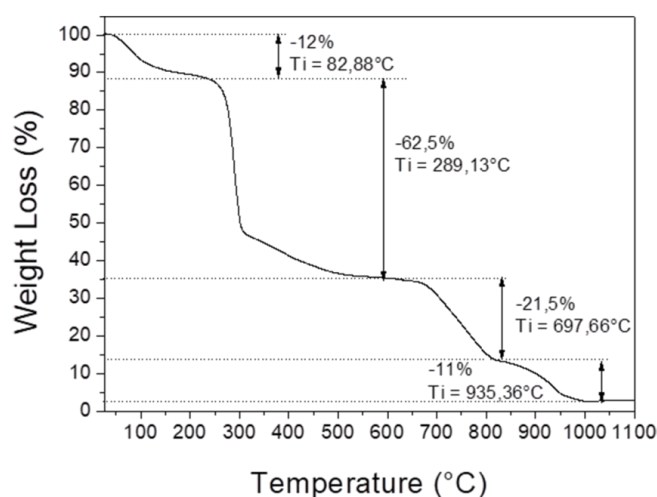


Figure S2. TGA thermogram of Na-CMC powder with highlighted weight loss steps.

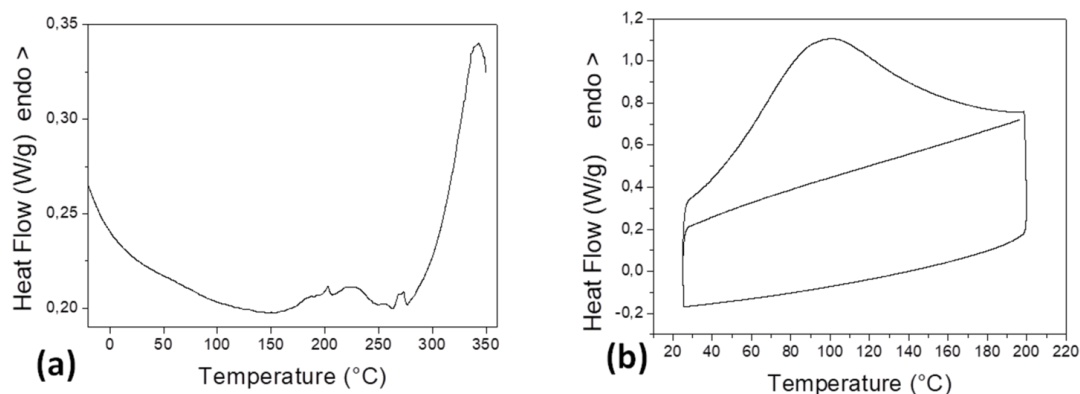


Figure S3. DSC thermogram of (a) PDMS and (b) Na-CMC powder.

DSC analysis in Figure S3a was performed on a Mettler-Toledo 822 (Mettler-Toledo, Greifensee, Switzerland) instrumentation in order to investigate the thermal behavior of the employed materials. For PDMS pellets, the analysis was performed under a nitrogen flux of 30 mL min⁻¹ applying a heating scan between -25 and 350 °C at 10 °C min⁻¹.

DSC program in Figure S3b for Na-CMC powder is based on a heating scan between 25 and 200 °C at 10 °C min⁻¹, followed by a cooling one between 200 and 25 °C with a rate of 5 °C min⁻¹ and a further heating scan equal to the first one.

In Figure S3a, DSC signal of PDMS, exhibiting a large concavity between 100 °C and 210 °C, suggests that the material softens rather than melting, confirming the amorphous character of the polymer microstructure. Moreover, the signal profile above 250 °C is representative of occurring polymer degradation, which reaches its maximum at about 330 °C.

DSC of Na-CMC in Figure S3b highlights that the material is highly hygroscopic and, until 200 °C, it is not subjected to any kind of modification. Indeed, in the first heating scan, DSC thermogram reveals a broad peak centered at about 100 °C, representative of the evaporation of a considerable amount of water, while no peaks are revealed in the second heating scan, performed after the cooling one.

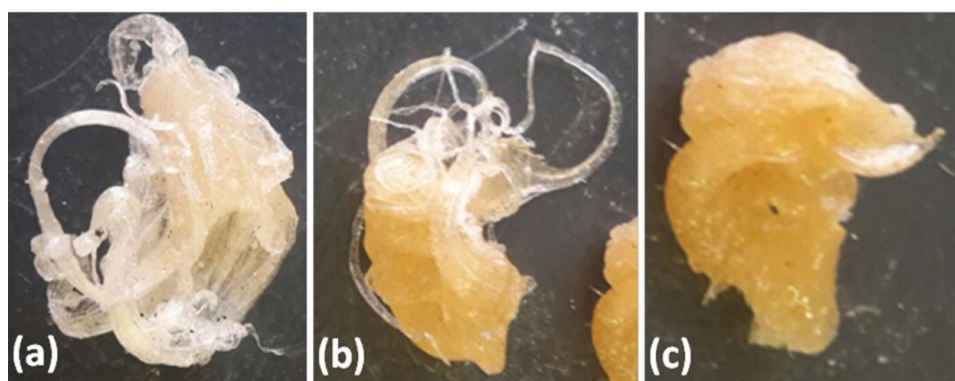


Figure S4. (a) (b) (c) Photos of the 3D-printed samples.