

# Method of Manufacturing Structural, Optically Transparent Glass Fiber-Reinforced Polymers (tGFRP) Using Infusion Techniques with Epoxy Resin Systems and E-Glass Fabrics

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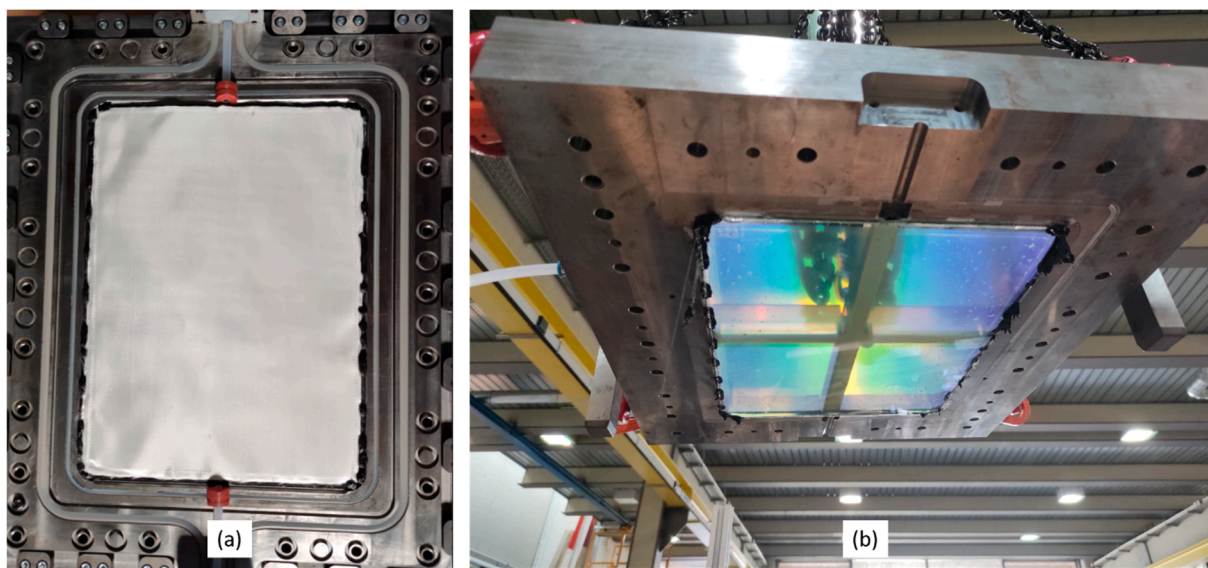
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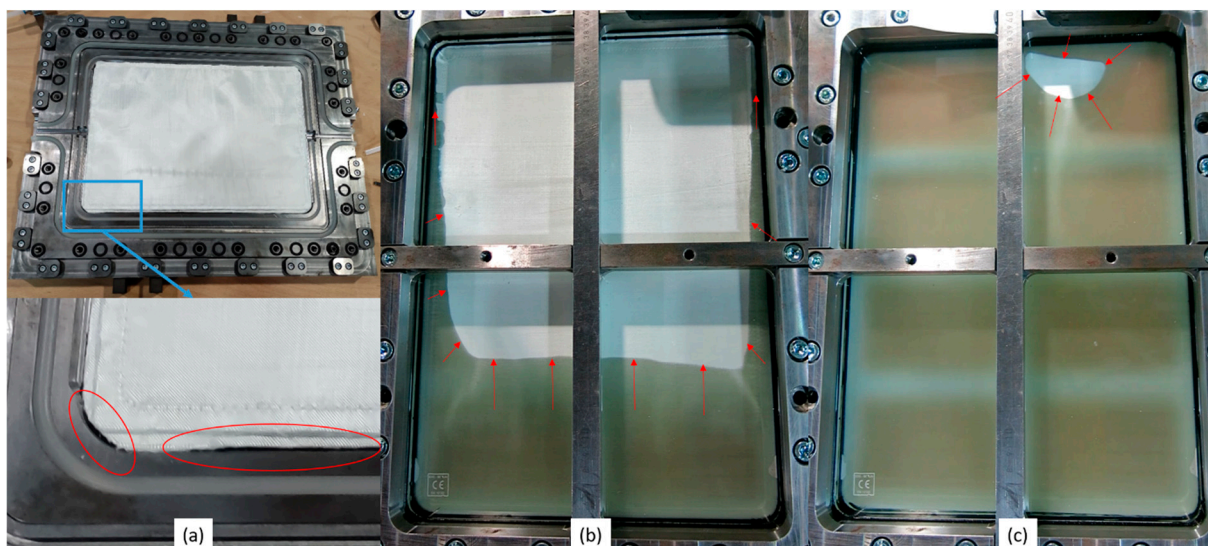
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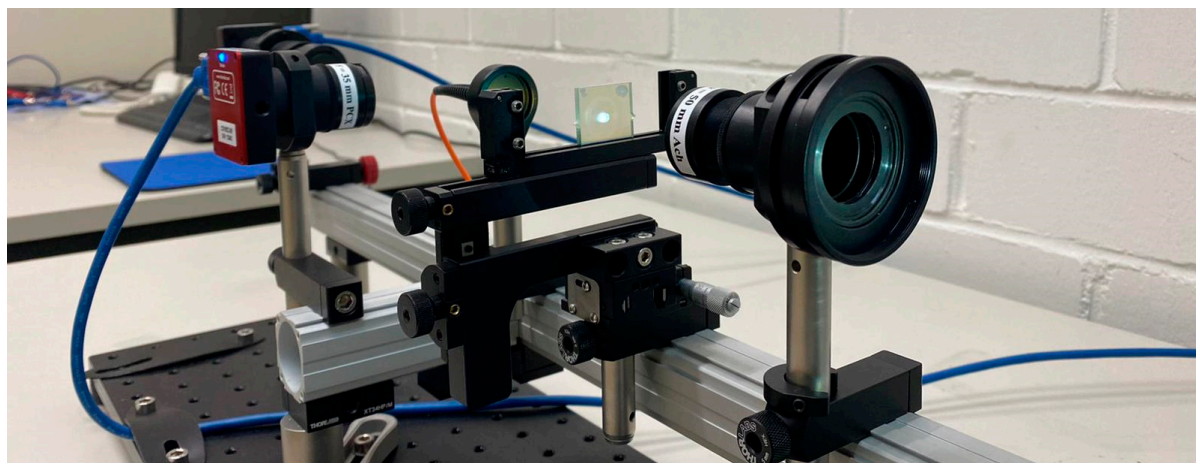
† These authors contributed equally to this work.



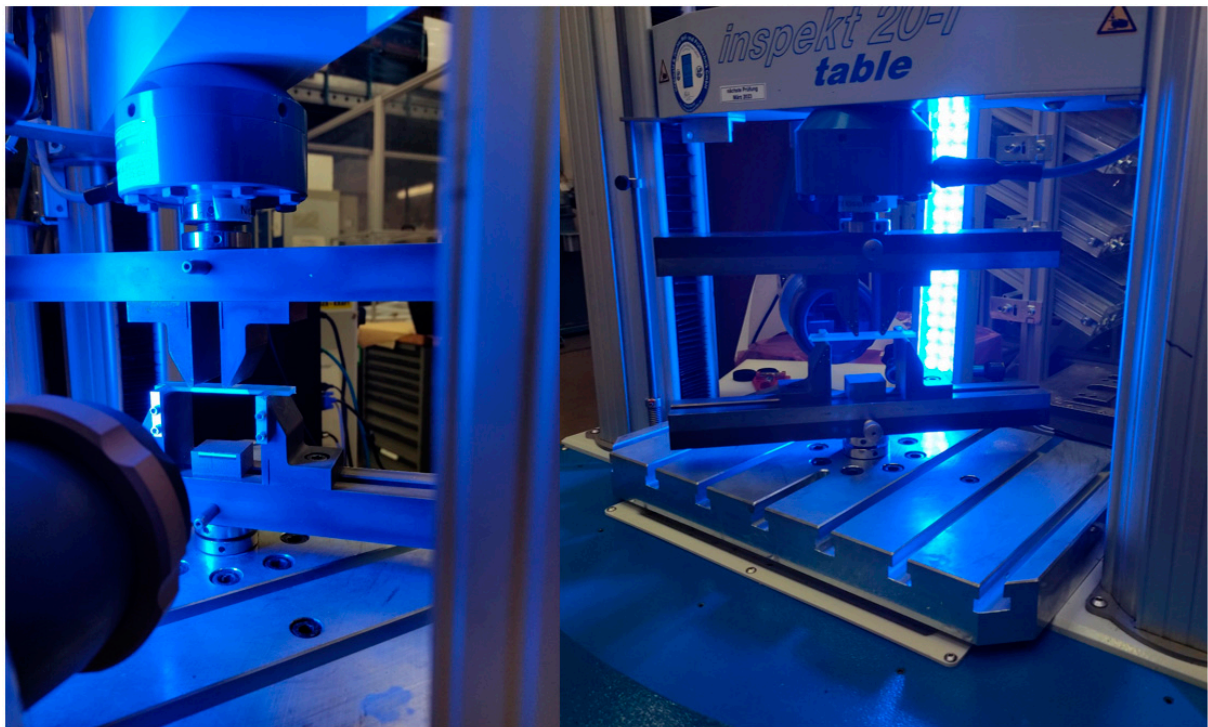
**Figure S1.** (a) Preform in the mold cavity and tacky tape (black) applied to prevent runners on the edges, (b) tGFRP plate sticking to the upper mold when opening after 24 h curing at room temperature.



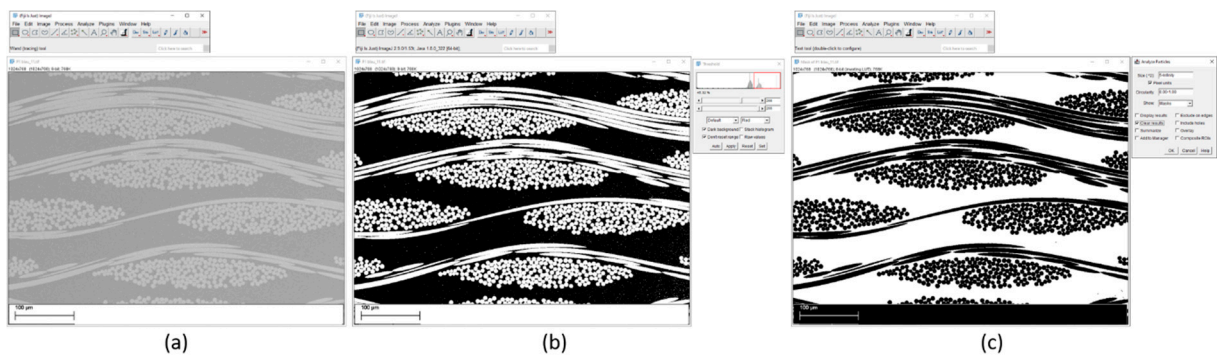
**Figure S2.** (a) Preform with cutting tolerances placed in a stiff mold with defined cavity dimensions leading to a fiber-free volume between preform and mold, (b) race-tracking (runners) on the preform edges, (c) uncontrolled flow-fronts colliding.



**Figure S3.** Spectrometer for transmittance measurements.



**Figure S4.** Four point bending apparatus (left: backside, right: front side).



**Figure S5.** Image preprocessing using ImageJ: (a) 8-bit grayscale, (b) BW-image with threshold values, (c) mask of BW-image.

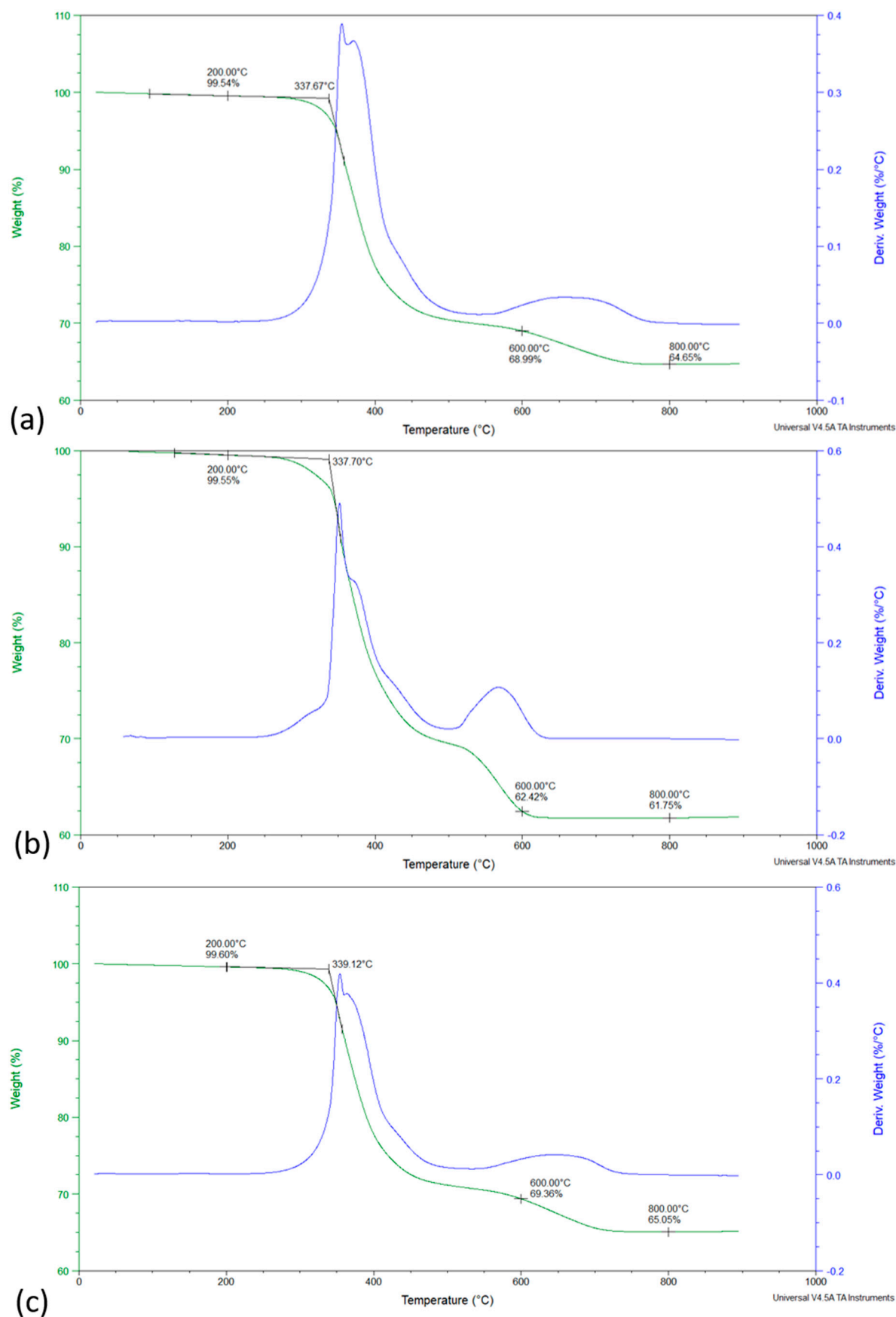
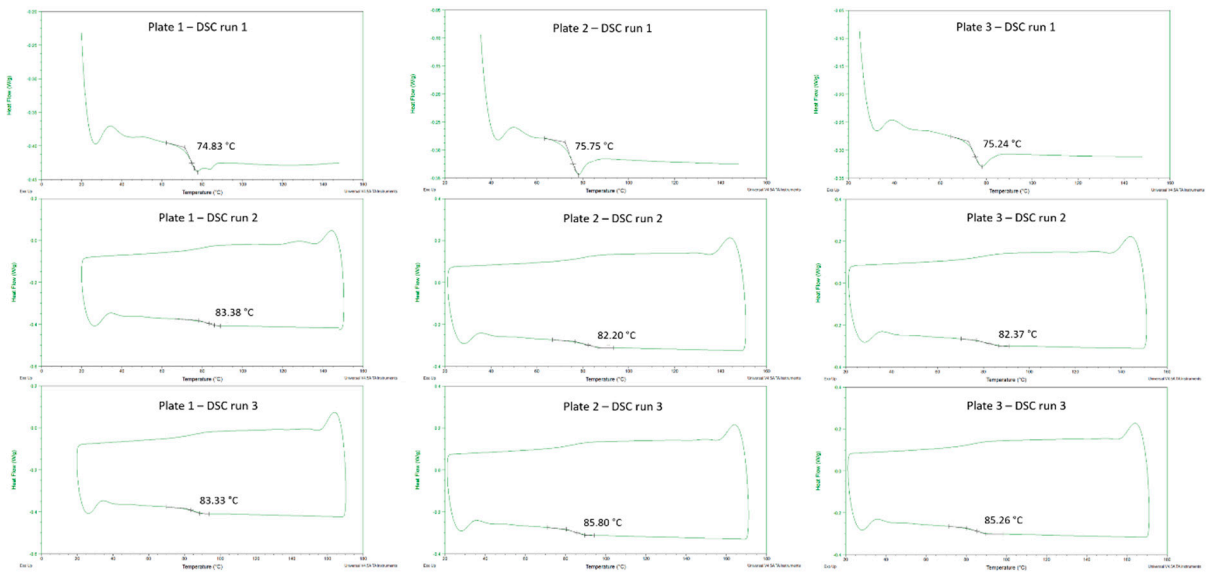
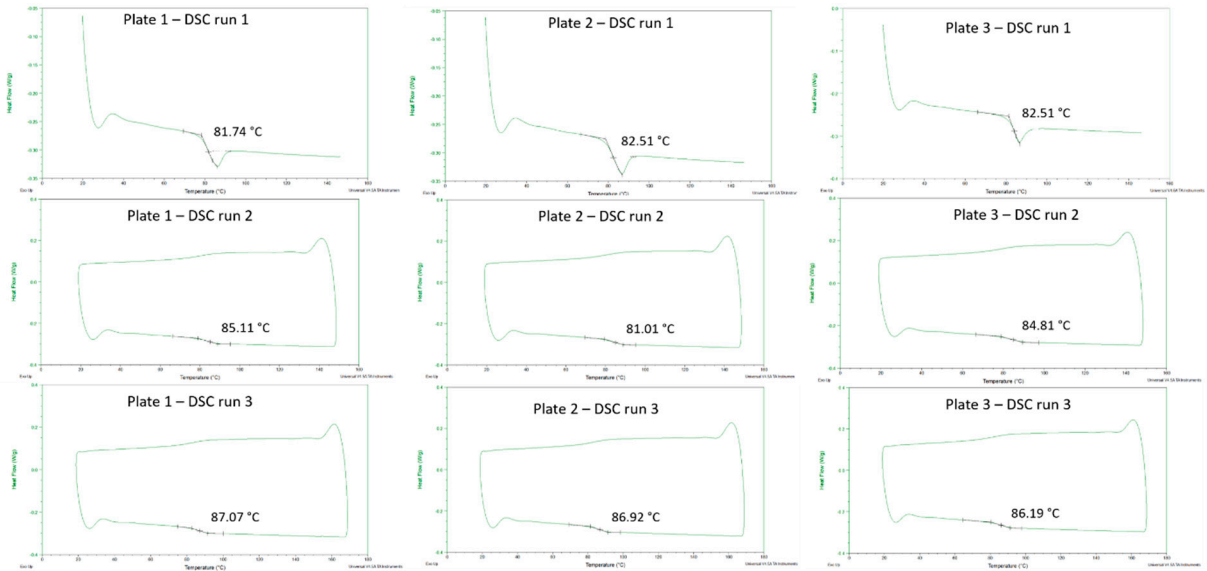


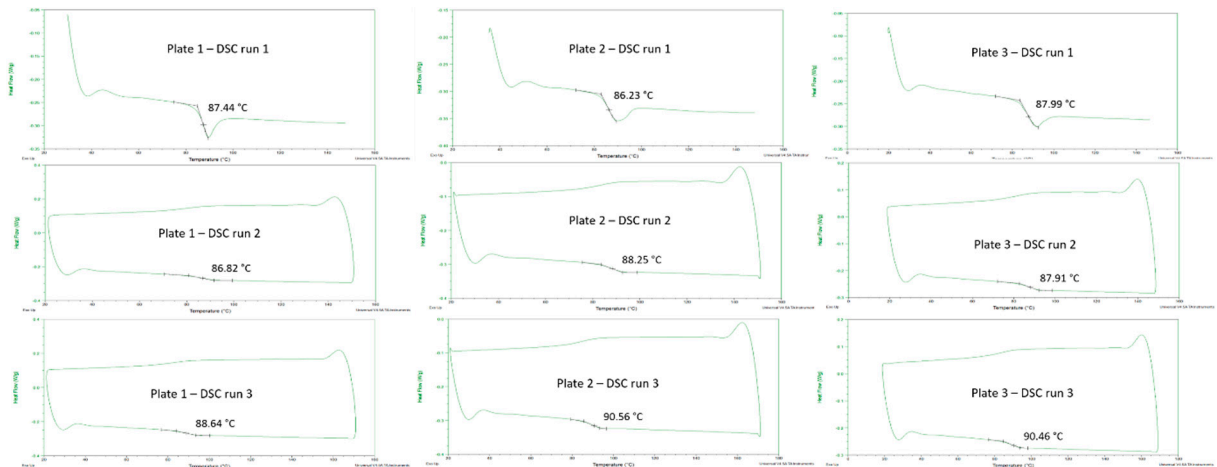
Figure S6. TGA Results of plate (a) 1, (b) 2 and (c) 3.



**Figure S7.** DSC results of tGFRP specimens after curing for 24 h at room temperature plus tempering for 15 h at 60 °C.



**Figure S8.** DSC results of tGFRP specimens after curing for 24 h at room temperature 39 h at 60 °C.



**Figure S9.** DSC results of tGFRP specimens after curing for 24 h at room temperature plus 87 h tempering at 60 °C.

**Table S1.** DSC results: 24 h at room temperature cure plus 15 h tempering at 60 °C.

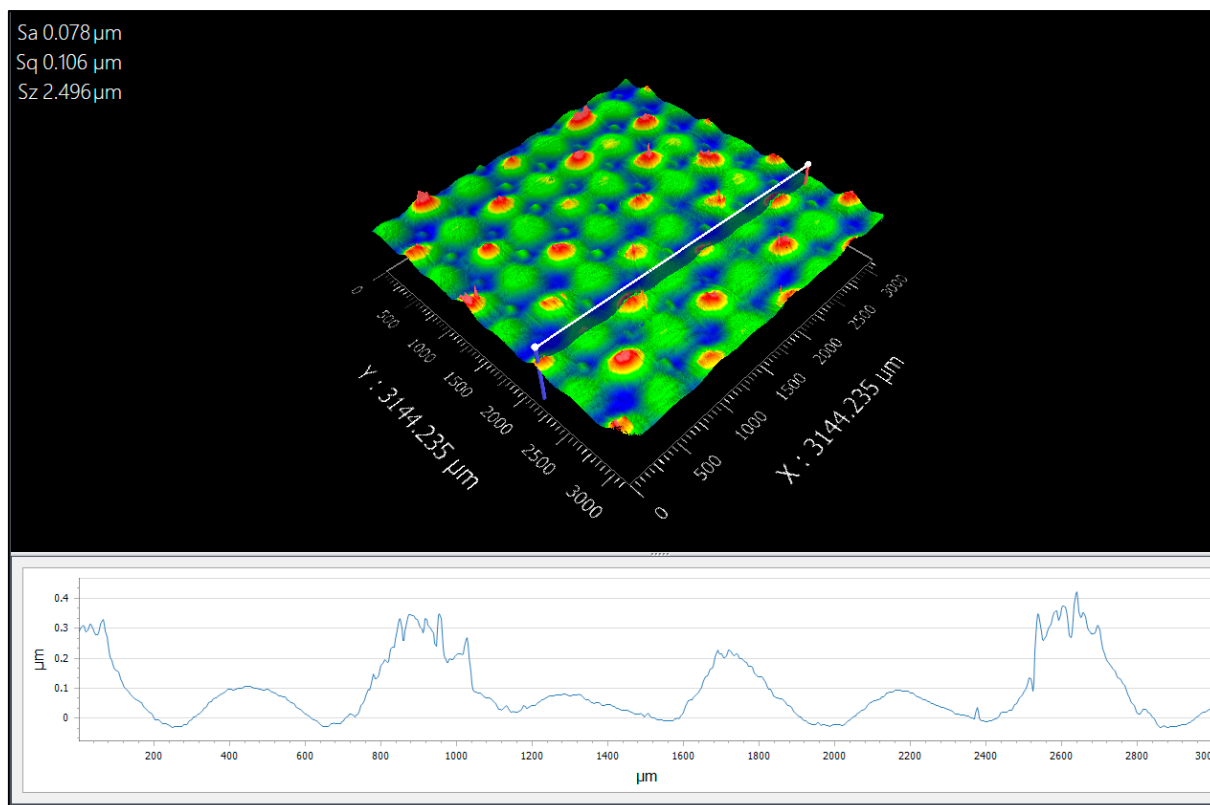
tGFRP	Tg DSC run 1 [°C]	Tg DSC run 2 [°C]	Tg DSC run 3 [°C]
Plate 1	74.49	83.38	83.33
Plate 2	75.75	82.20	85.80
Plate 3	75.24	82.37	85.26
Mean	75.16	82.65	84.80
Standard deviation	0.63	0.64	1.30

**Table S2.** DSC results: 24 h at room temperature cure plus 39 h tempering at 60 °C.

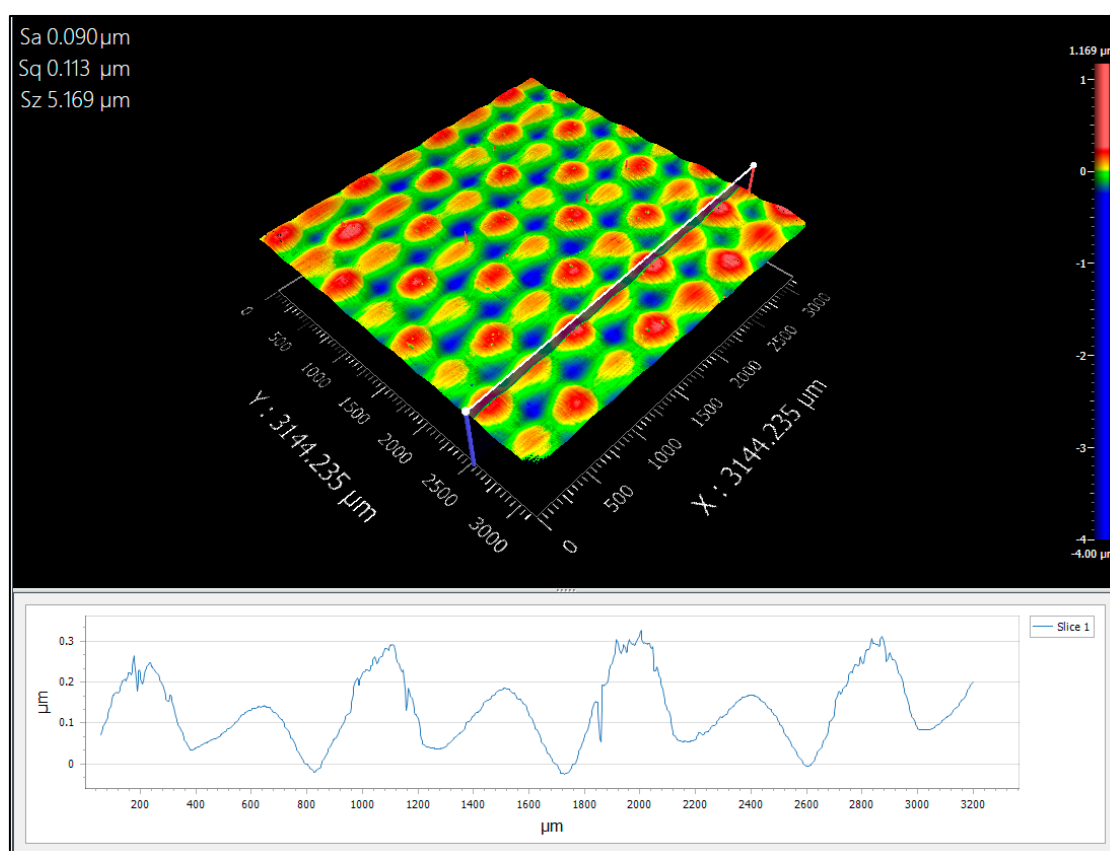
tGFRP	Tg DSC run 1 [°C]	Tg DSC run 2 [°C]	Tg DSC run 3 [°C]
Plate 1	81.74	85,11	87,07
Plate 2	82.51	85,01	86,92
Plate 3	84.01	84,81	86,19
Mean	82.75	84.98	86.73
Standard deviation	1.15	0.15	0.47

**Table S3.** DSC results: 24 h at room temperature cure plus 87 h tempering at 60 °C.

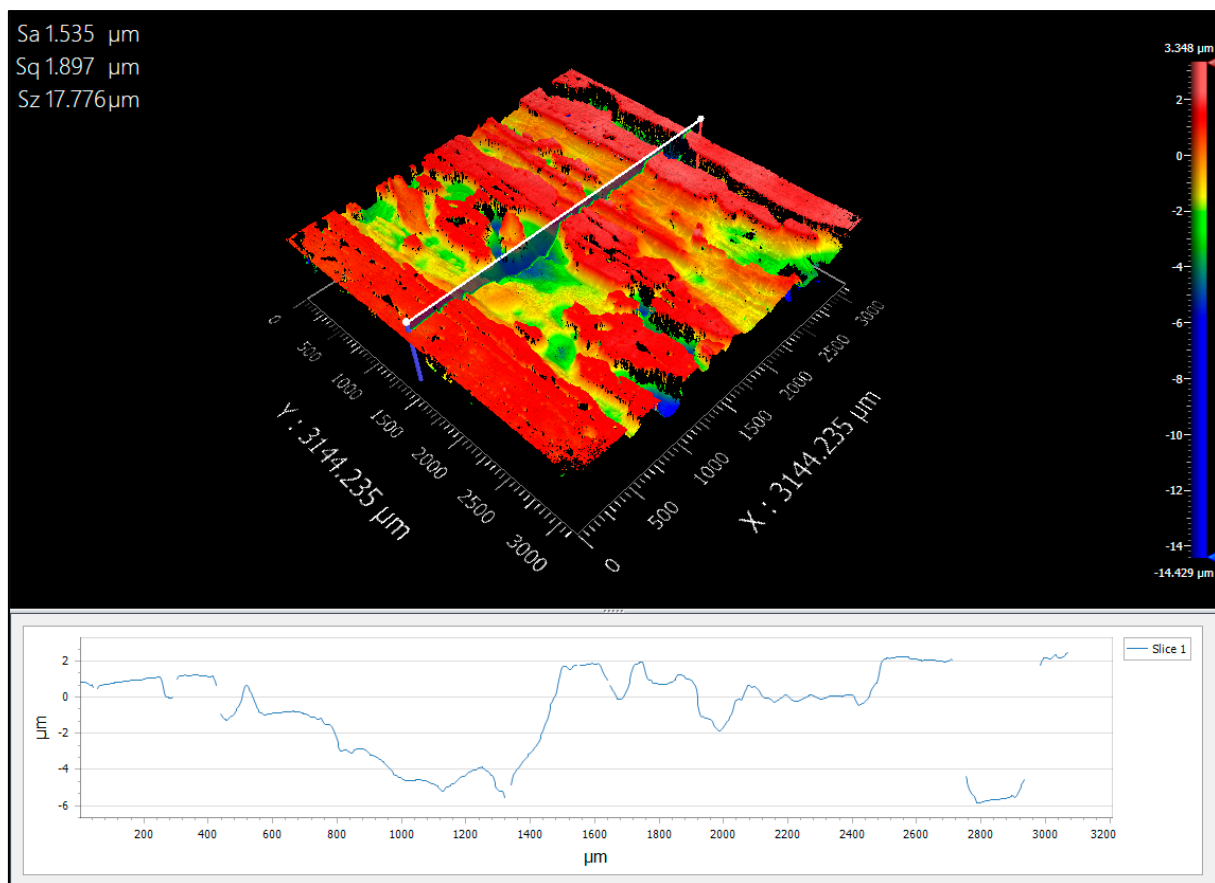
tGFRP	Tg DSC run 1 [°C]	Tg DSC run 2 [°C]	Tg DSC run 3 [°C]
Plate 1	87.44	86.82	88.64
Plate 2	86.23	88.25	90.56
Plate 3	87.99	87.91	90.46
Mean	87.22	87.66	89.89
Standard deviation	0.90	0.75	1.08



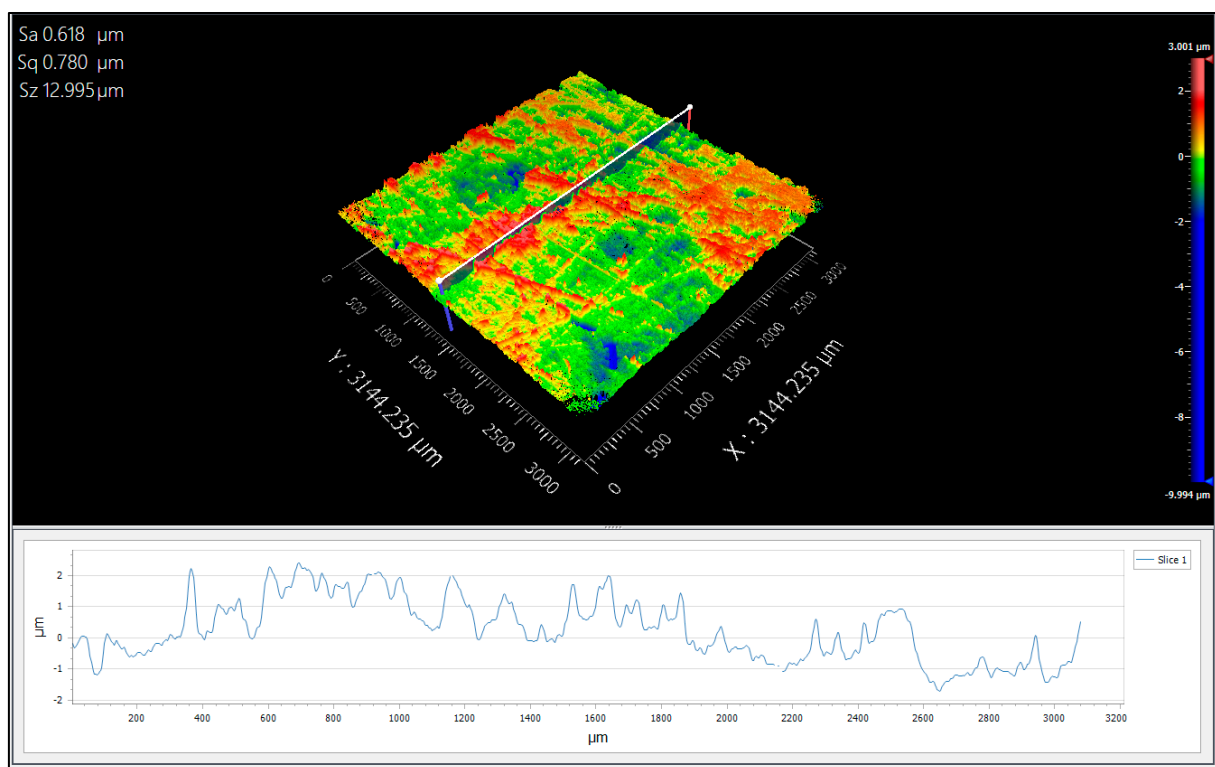
**Figure S10.** White light Interferometer data of the top surface of the Optical-RTM produced sample.



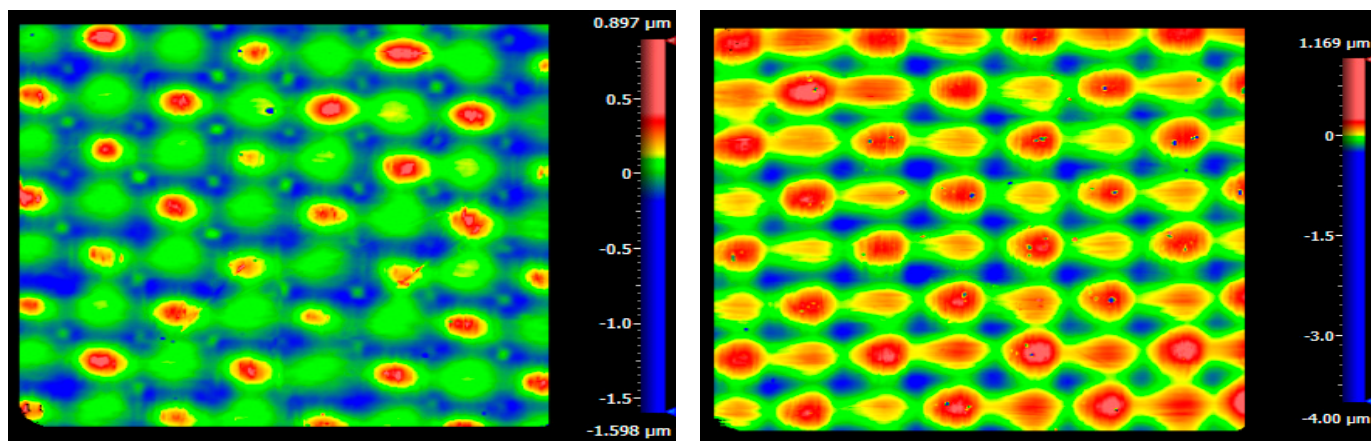
**Figure S11.** White light Interferometer data of the bottom surface of the Optical-RTM produced sample.



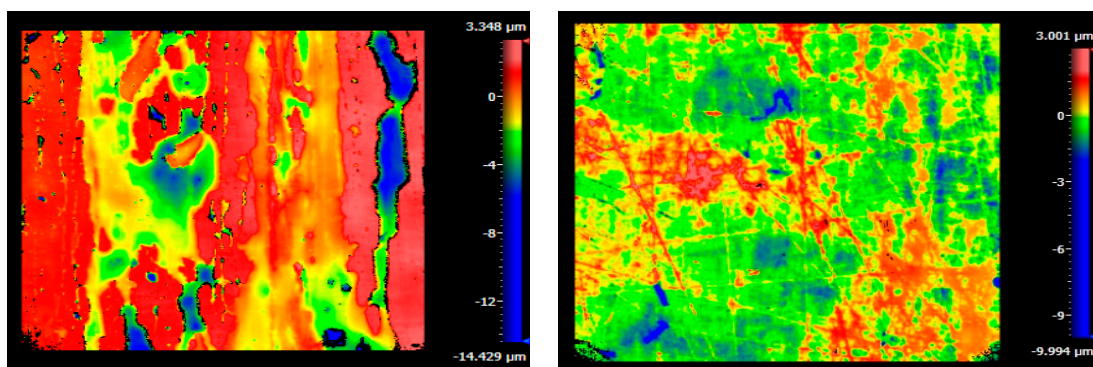
**Figure S12.** White light Interferometer data of the top surface of the standard-RTM produced sample.



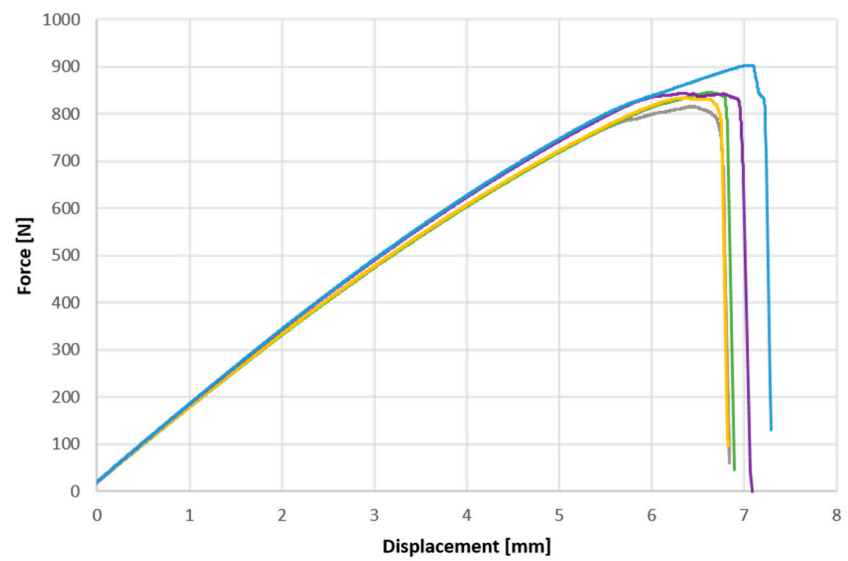
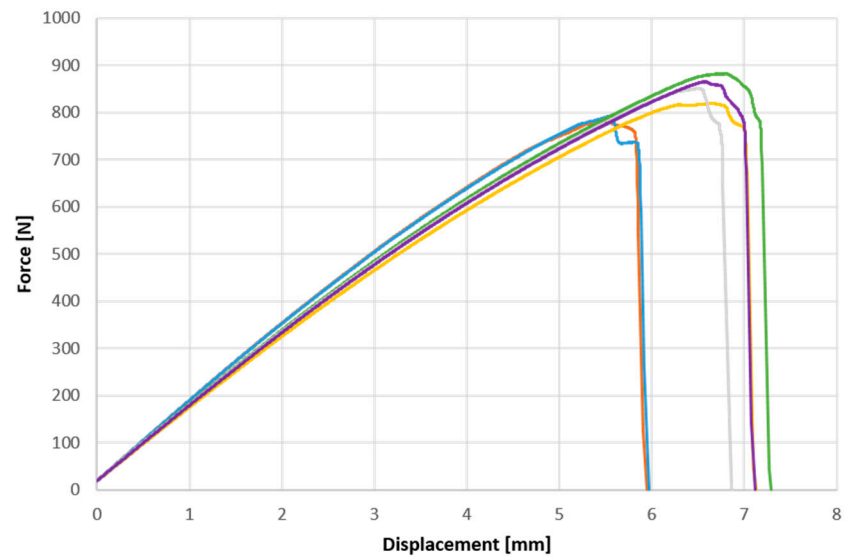
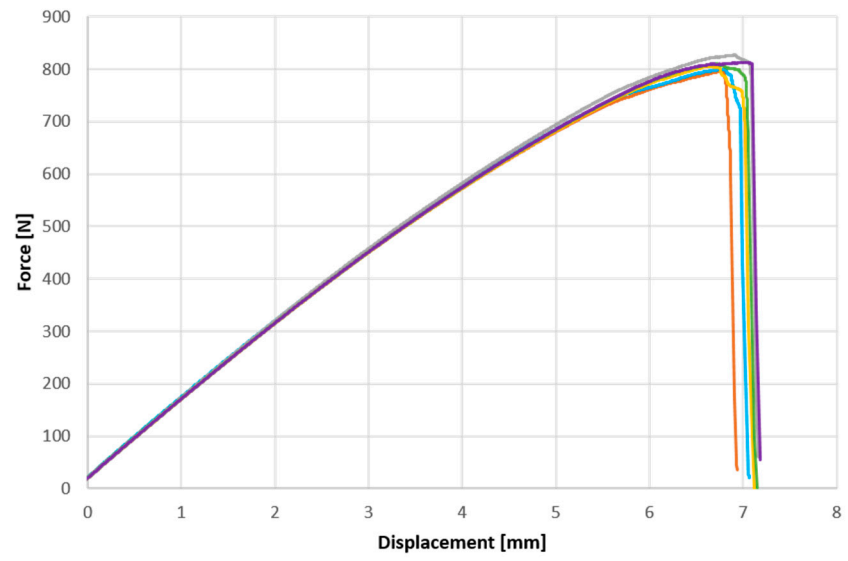
**Figure S13.** White light Interferometer data of the bottom surface of the standard-RTM produced sample.



**Figure S14.** 2D view of the white light interferometer data of the Optical-RTM produced sample; left: top, right: bottom surfaces.



**Figure S15.** 2D view of the white light interferometer data of the standard-RTM produced sample; left: top, right: bottom surfaces.



**Figure S16.** Force-Displacement diagrams of the four point bending characterization of tGFRP plate 1-3 (top to bottom).