

Dispersion of cellulose nanofibers in methacrylate-based nanocomposites - Supplementary information

Materials

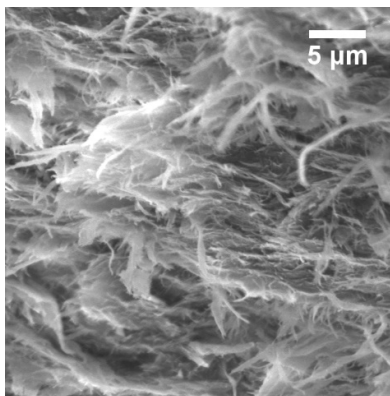


Figure S1. SEM image of CNF dried from water suspension.

Matrix PMMA-co-MAA

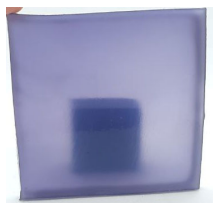
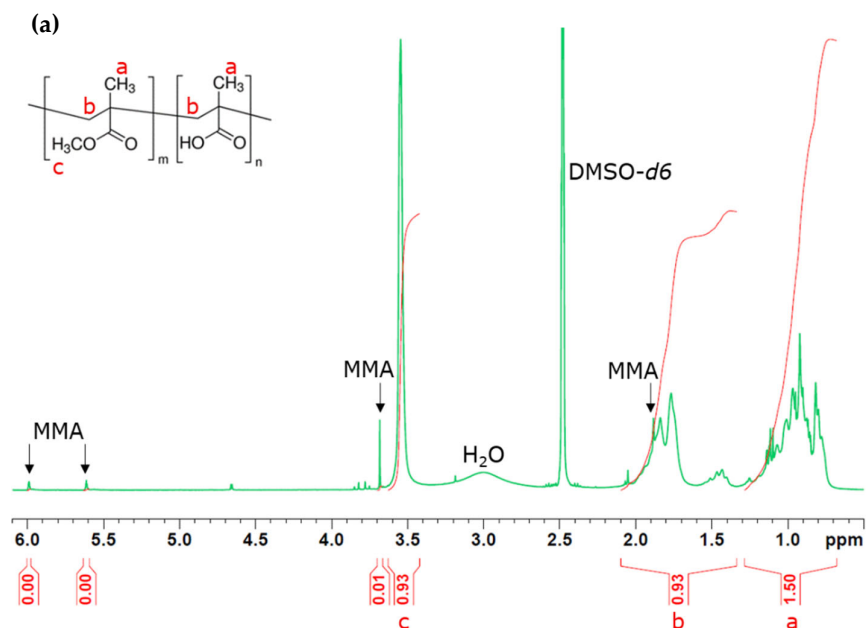


Figure S2. Transparent sample bulk polymerized PMMA-co-MAA.



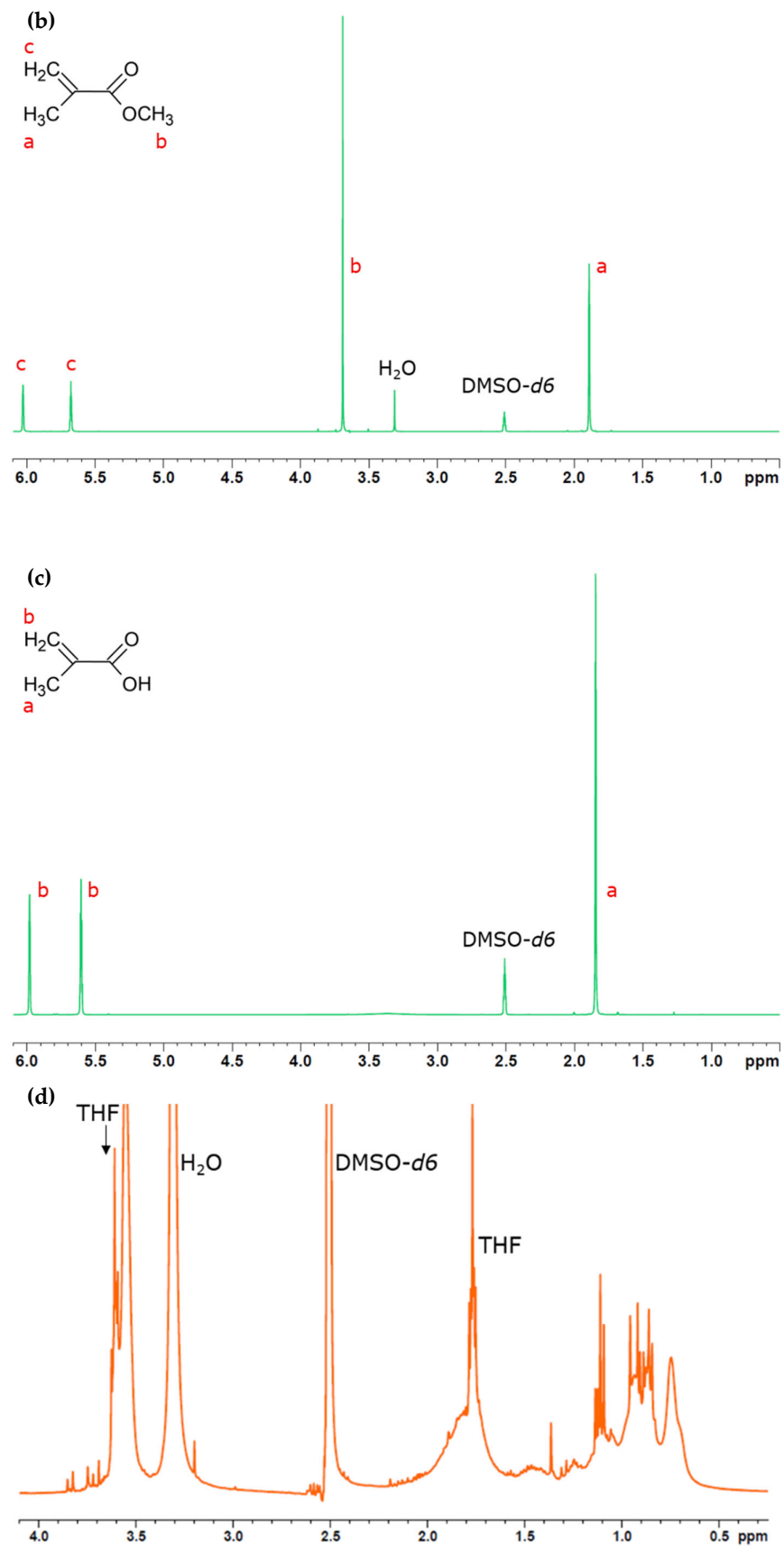


Figure S3. ^1H NMR spectrum at 90°C for PMMA-co-MAA after copolymerization (a), at 25°C for MMA (b) and MAA (c), and PMMA-co-MAA after compression molding of the film (c) (400MHz, DMSO- d_6).

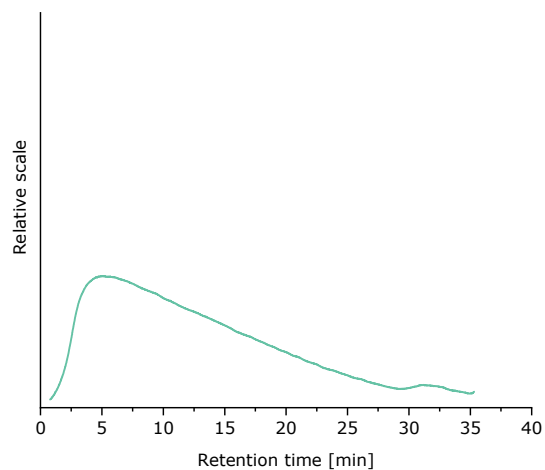


Figure S4. Retention time distribution PMMA-co-MAA (30wt% MAA).

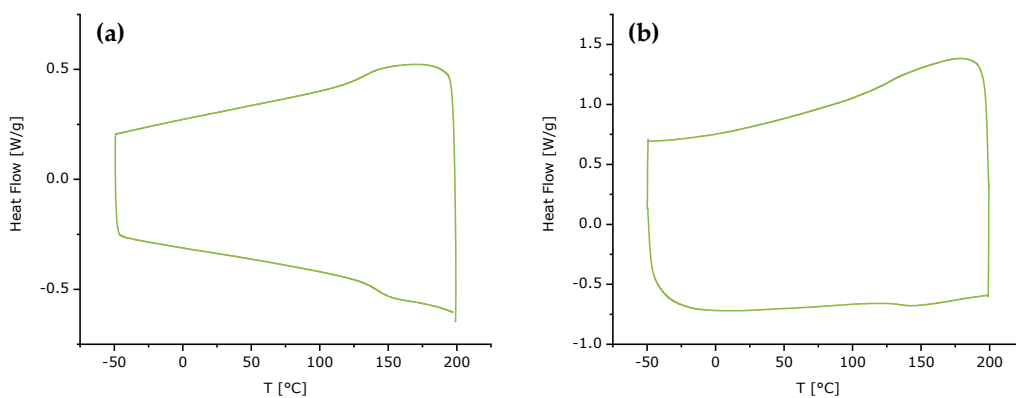


Figure S5. DSC thermograms of pristine PMMA-co-MAA showing a T_g at 150°C (a) and after film compression moulding at 230°C showing a T_g at 134°C (b) (heating rate 10°C/min).

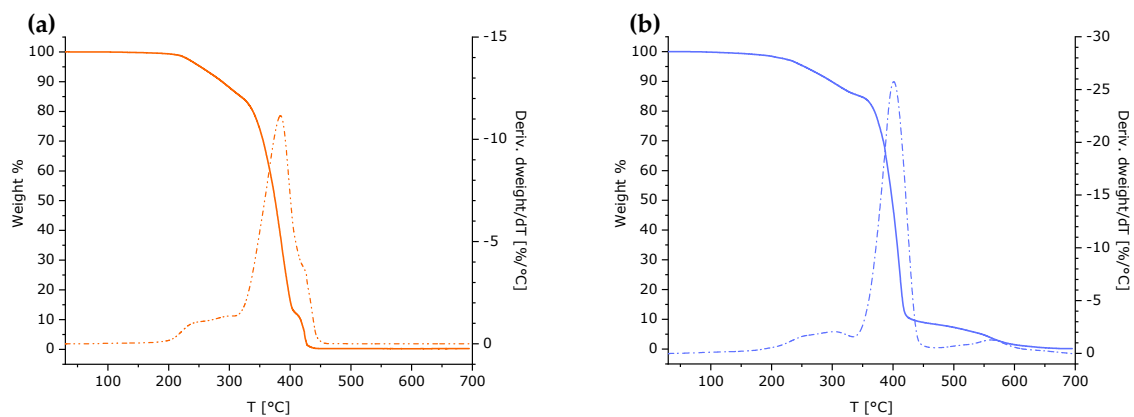


Figure S6. Thermogravimetric traces of PMMA-co-MAA in air (a) and in nitrogen (b).

Nanocomposite films from THF/water solution

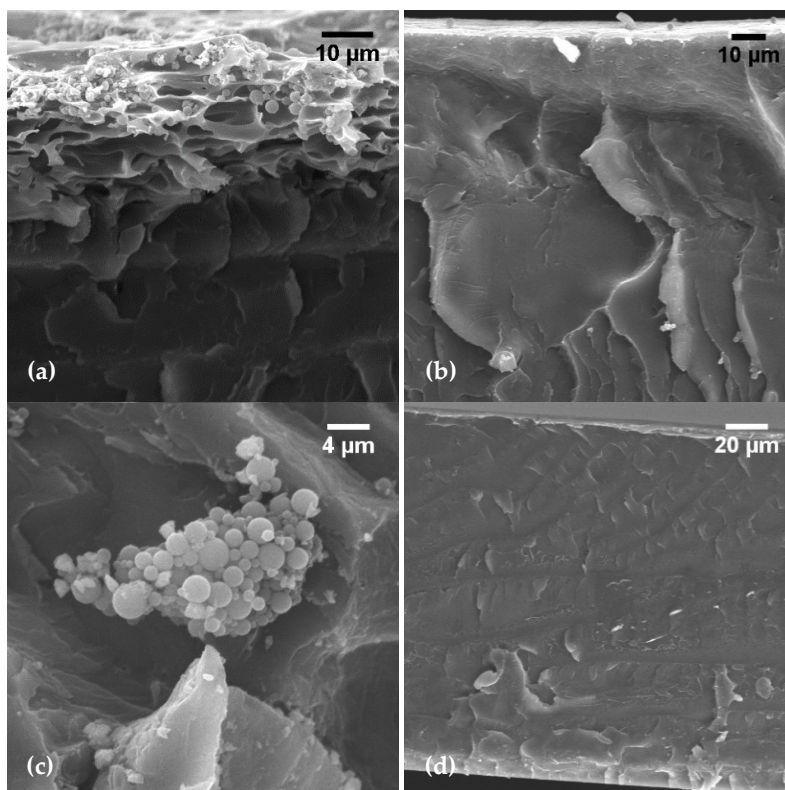


Figure S7. SEM images of neat PMMA-co-MAA evaporated from THF/water from 77/23vol% (a), 95/5vol% (azeotropic composition) (b) with details of spherical inclusions (c) and from pure THF (d).

Nanocomposite films from THF/MeOH solution

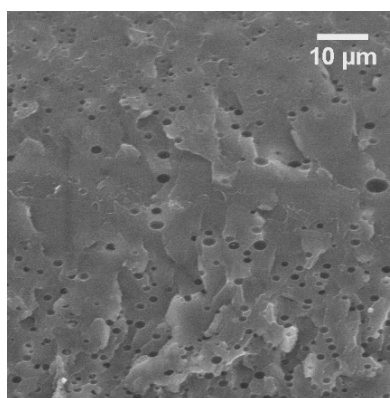


Figure S8. SEM image of neat PMMA-co-MAA casted from THF/MeOH 90/10vol% solution.

Solvent exchange

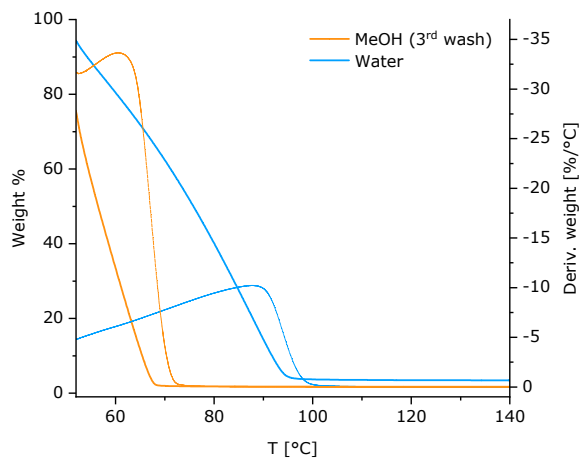


Figure S9. TGA thermogram for CNF water suspension and MeOH-wetted CNF after third washing (5°C/min).

Nanocomposite films from THF/MeOH solution

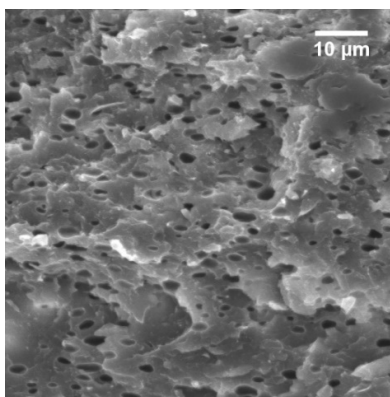


Figure S10. Residual porosity after solvent casting (THF/MeOH 66/34vol%) in PMMA-*co*-MAA + 10wt% CNF film before compression moulding.

Spectroscopy of nanocomposites

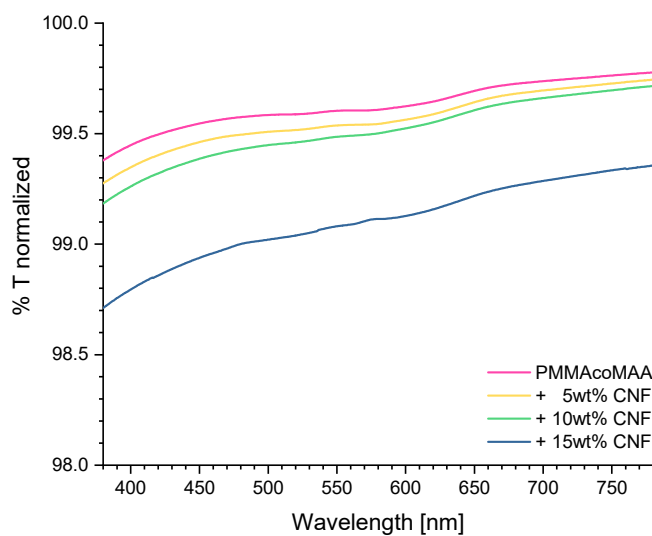


Figure S11. UV spectra of compression molded films of neat PMMA-*co*-MAA and nanocomposites (5, 10 and 15wt% of CNF).

CNF film as reference for ATR measurements was prepared by drying CNF water suspension overnight under hood and 2h under vacuum (30 mbar) at 100°C.

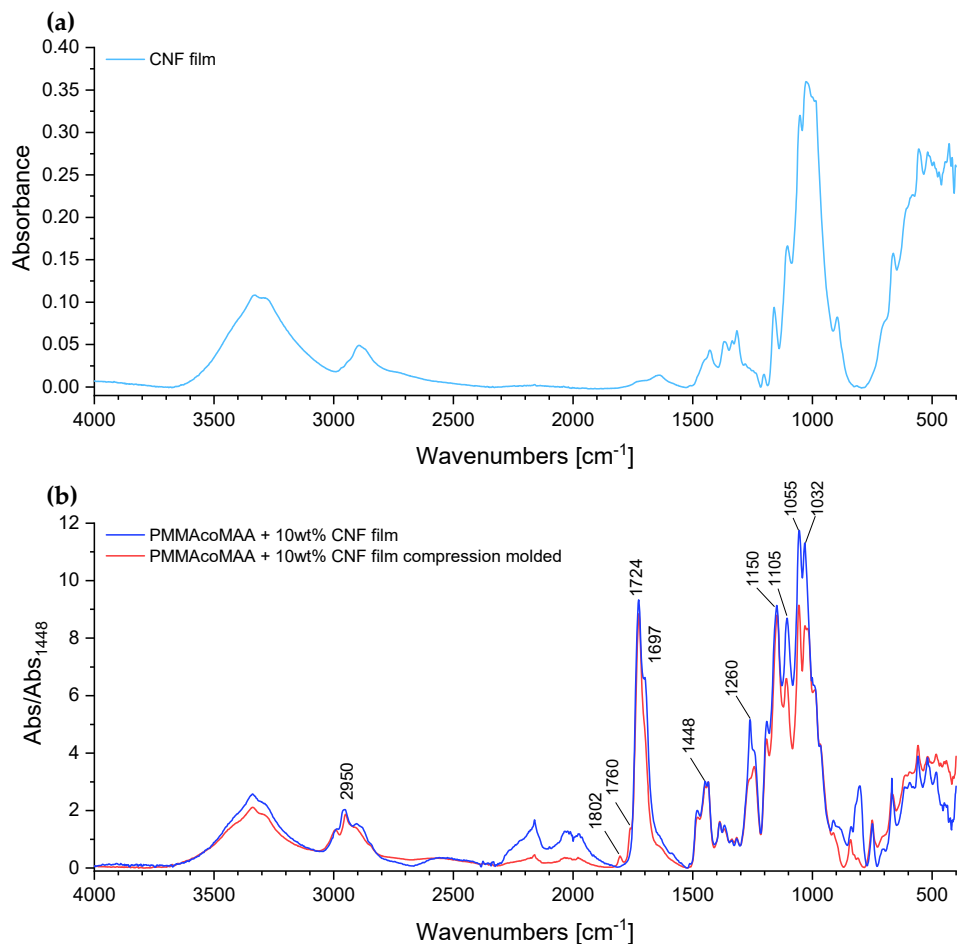


Figure S12. ATR spectra of CNF film (a) and PMMA-*co*-MAA + 10wt% CNF before and after compression moulding at 230°C (b).

Thermal properties of nanocomposites

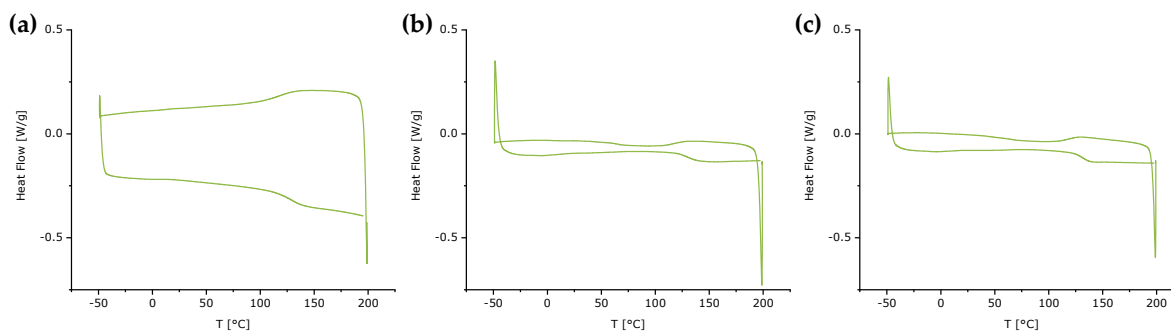


Figure S13. DSC thermograms of nanocomposites films of PMMA-*co*-MAA + 5wt% CNF with T_g at 129°C (a) + 10wt% CNF with T_g at 130°C (b) and + 15wt% CNF with T_g at 132°C (c) (heating rate 10°C/min).