

SUPPORTING INFORMATION

Using Cellulose Nanocrystals as a Sustainable Additive to Enhance Hydrophilicity, Mechanical and Thermal Properties of Poly (vinylidene fluoride)/Poly (methyl methacrylate) Blend

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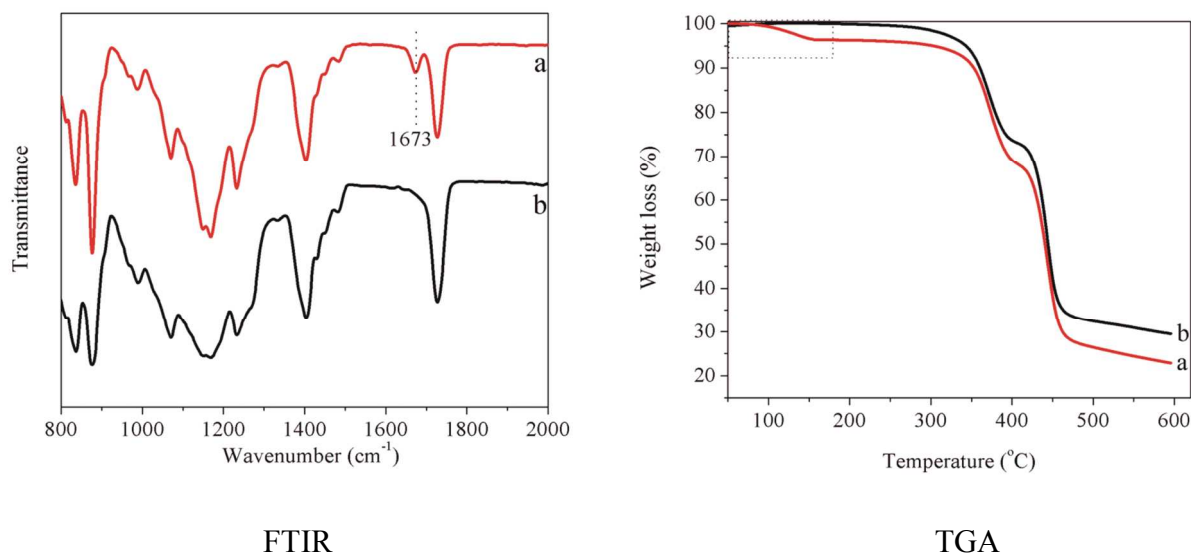


Fig. S1 FTIR and TGA curves of PVDF/PMMA/CNCs composite with 3 wt% CNCs before and after methanol extraction (a, b represents the samples before and after extraction, respectively).

The ethanol was selected as the extracting agent to remove the DMF residue in the composites because ethanol is non-solvent for PVDF, PMMA and CNCs. Similar method is also used in PVDF/PMMA binary blend system¹. Both Fourier transform infrared spectroscopy (FTIR) measurement (Bruker FTIR analyzer Tensor-27, Bruker Optics, Billerica, MA) with an

attenuated total reflectance (ATR) mode and thermo-gravimetric (TG) analysis (Q-50, TA Instruments-Waters LLC, New Castle, DE) tests are used to determine whether the DMF was successfully removed. As shown in Fig. S1, the film before the extraction showed an absorption band at 1673 cm^{-1} (curve a in FTIR curves), which was an indication of the existence of DMF. Similarly, one can also observe in TG curves that there was a weight loss step before $200\text{ }^{\circ}\text{C}$ for curve a, which also corresponds to the weight loss of DMF (DMF has a boiling point of $153\text{ }^{\circ}\text{C}$). However, after the extraction, the absorption band at 1673 cm^{-1} (curve b in FTIR curves) was disappeared, and there is no weight loss corresponded with DMF (curve b in TG curves). Therefore, it can be concluded that any residue DMF was removed with the help of extraction method. Thus, the role of DMF in properties of materials is ruled out.

References

- (1) Ma, W.; Zhang, J.; Wang, X.; Wang, S. Effect of PMMA on crystallization behavior and hydrophilicity of poly (vinylidene fluoride)/poly (methyl methacrylate) blend prepared in semi-dilute solutions. *Appl. Surf. Sci.* **2007**, *253*, 8377-8388.