

Synthesis and characterization of core-double shell structured PVDF-*grafted*-BaTiO₃/P(VDF-*co*-HFP) nanocomposite films

^f CISUP, Centro per l'Integrazione della Strumentazione dell'Università di Pisa, Lungarno Pacinotti 43/44, 56126, Pisa, Italy

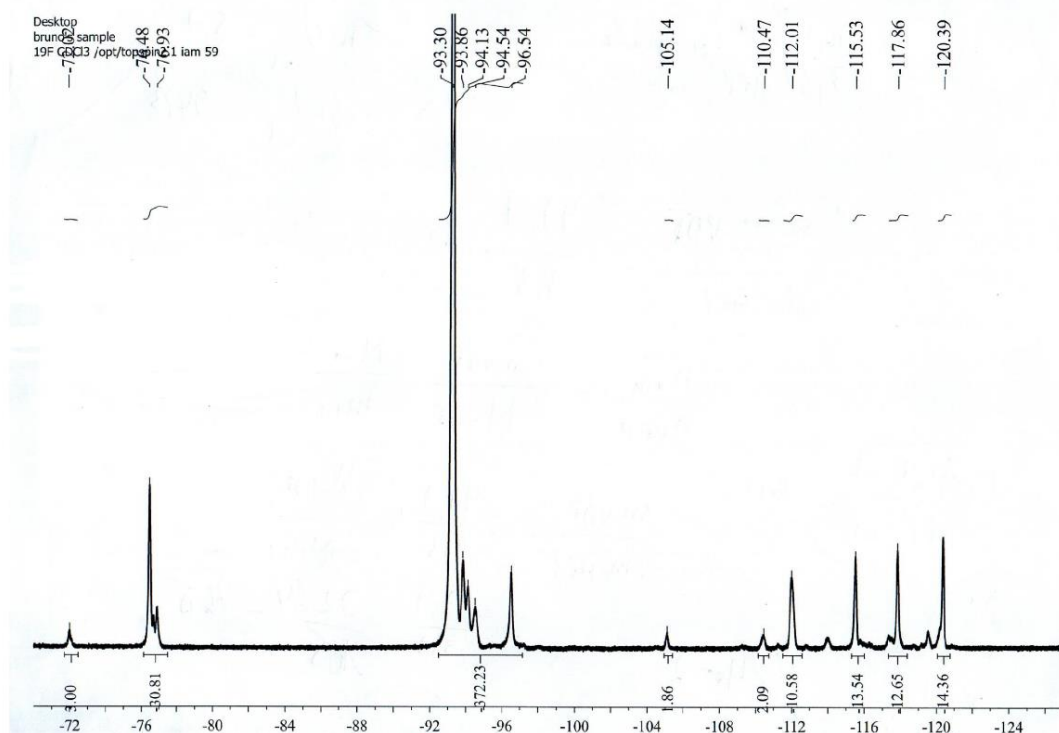
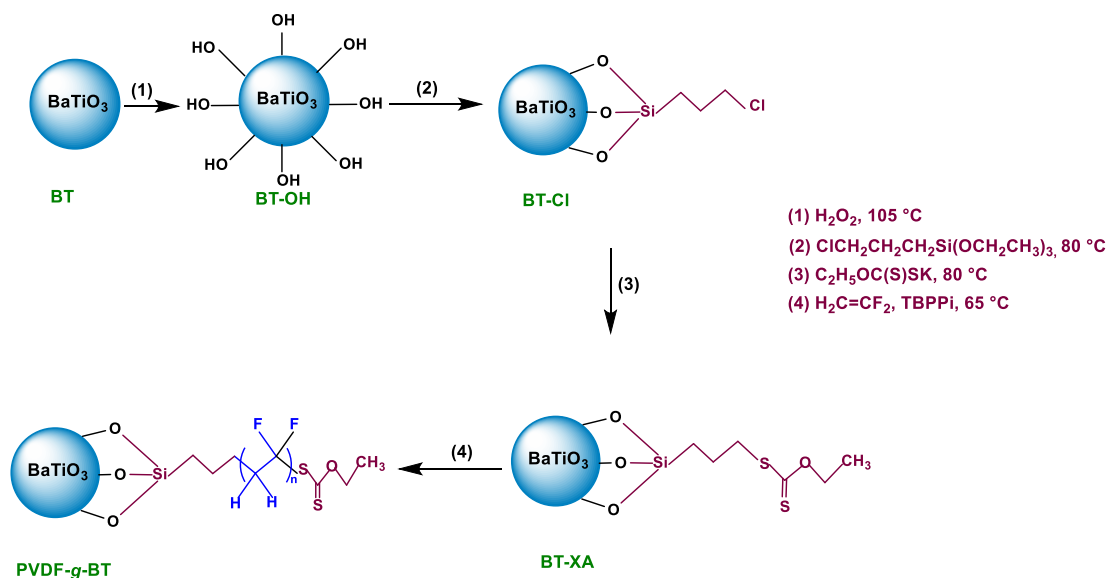


Figure S1. ^{19}F NMR spectrum of commercially available P(VDF-*co*-HFP) recorded in CDCl_3 .

The VDF content was determined using Equation (1), and was estimated to be 97 mol %.

$$\text{mol. \% VDF} = \frac{\int_{-92.0}^{-119} \text{VDF}/2}{\int_{-92.0}^{-119} \text{VDF}/2 + \int_{-119.5}^{-120.5} \text{HFP}/2}$$



Scheme S1. Sketch illustrating the synthesis process of PVDF-*g*-BaTiO₃ nanocomposites by RAFT polymerization of VDF in the presence of Xanthates (from the modification of BaTiO₃ nanoparticles) where TBPPi stands for *tert*-butyl peroxyphosphate [1].

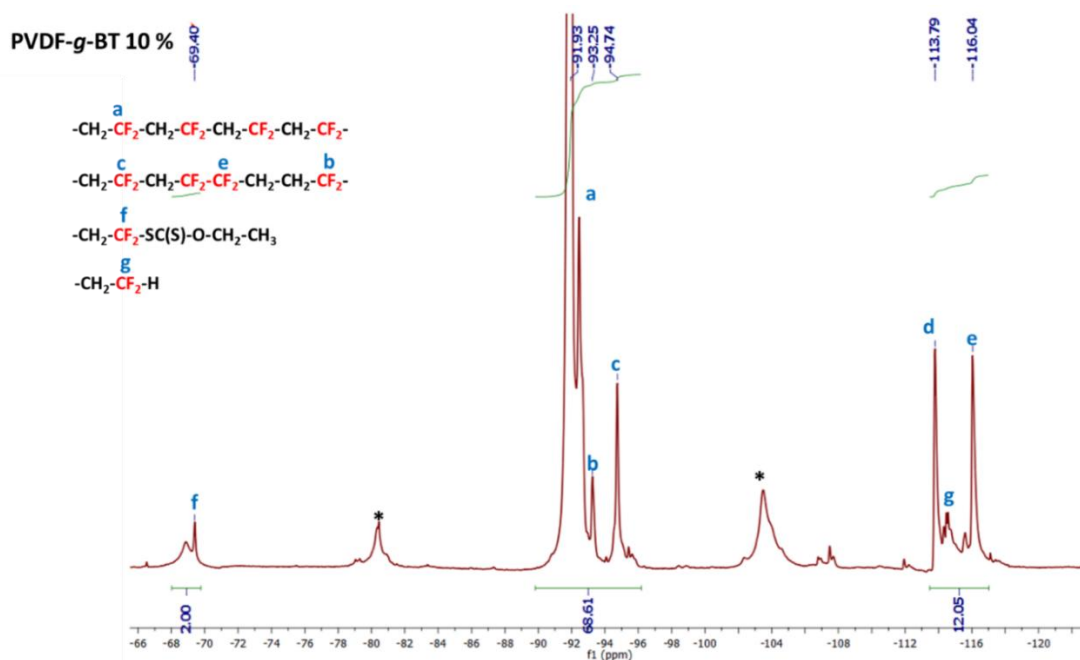


Figure S2. Expansion of the -64 to -120 ppm region of the ¹⁹F HRMAS spectrum recorded in d₆-DMSO of PVDF-*g*-BaTiO₃ nanocomposite filled with 10 wt % of BaTiO₃ (* stands for the spinning bands).

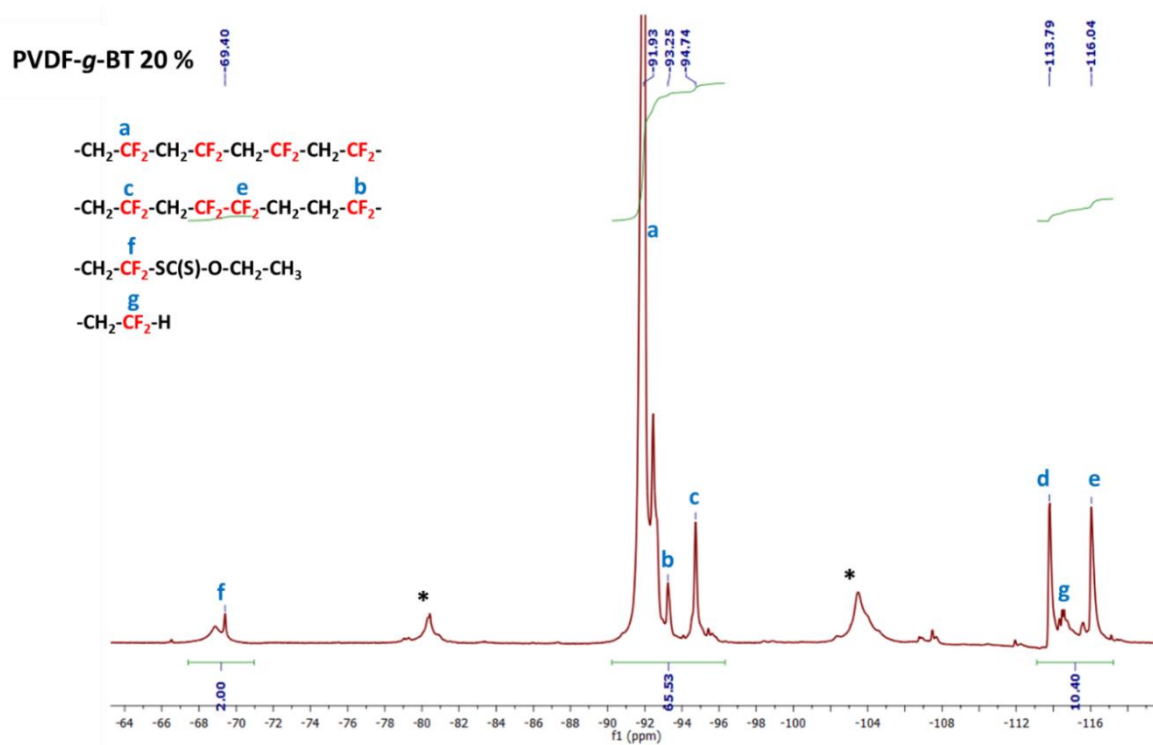


Figure S3. Expansion of the -64 to -120 ppm region of the ^{19}F HRMAS spectrum recorded in $\text{d}_6\text{-DMSO}$ of PVDF-g-BaTiO₃ nanocomposite filled with 20 wt % of BaTiO₃ (* stands for the spinning bands).

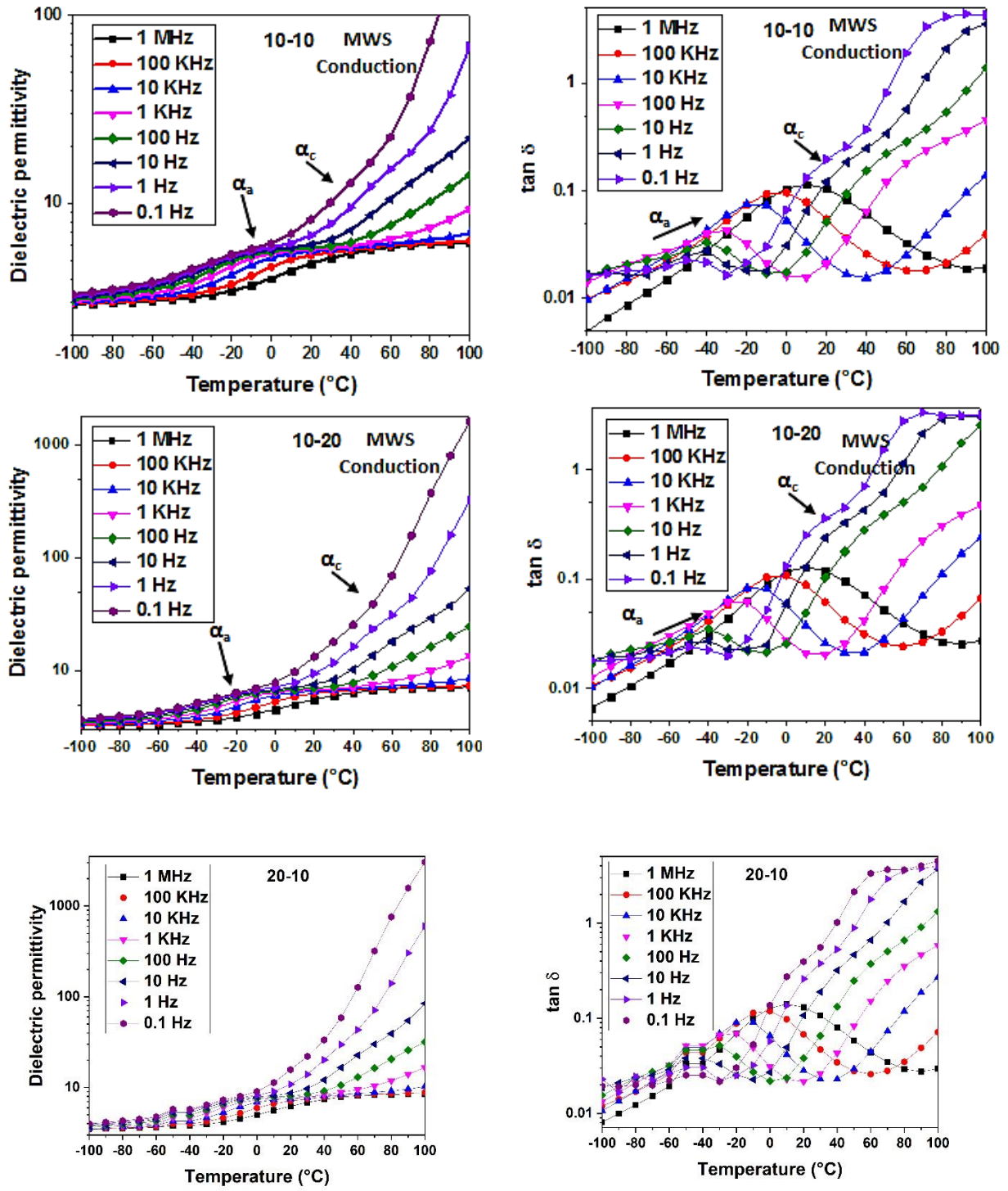


Figure S4. Dielectric permittivity, ϵ' , (left) and loss tangent, $\tan \delta$, (right) of 10-10, 10-20, and 20-10 nanocomposites films *versus* temperature at different frequencies.

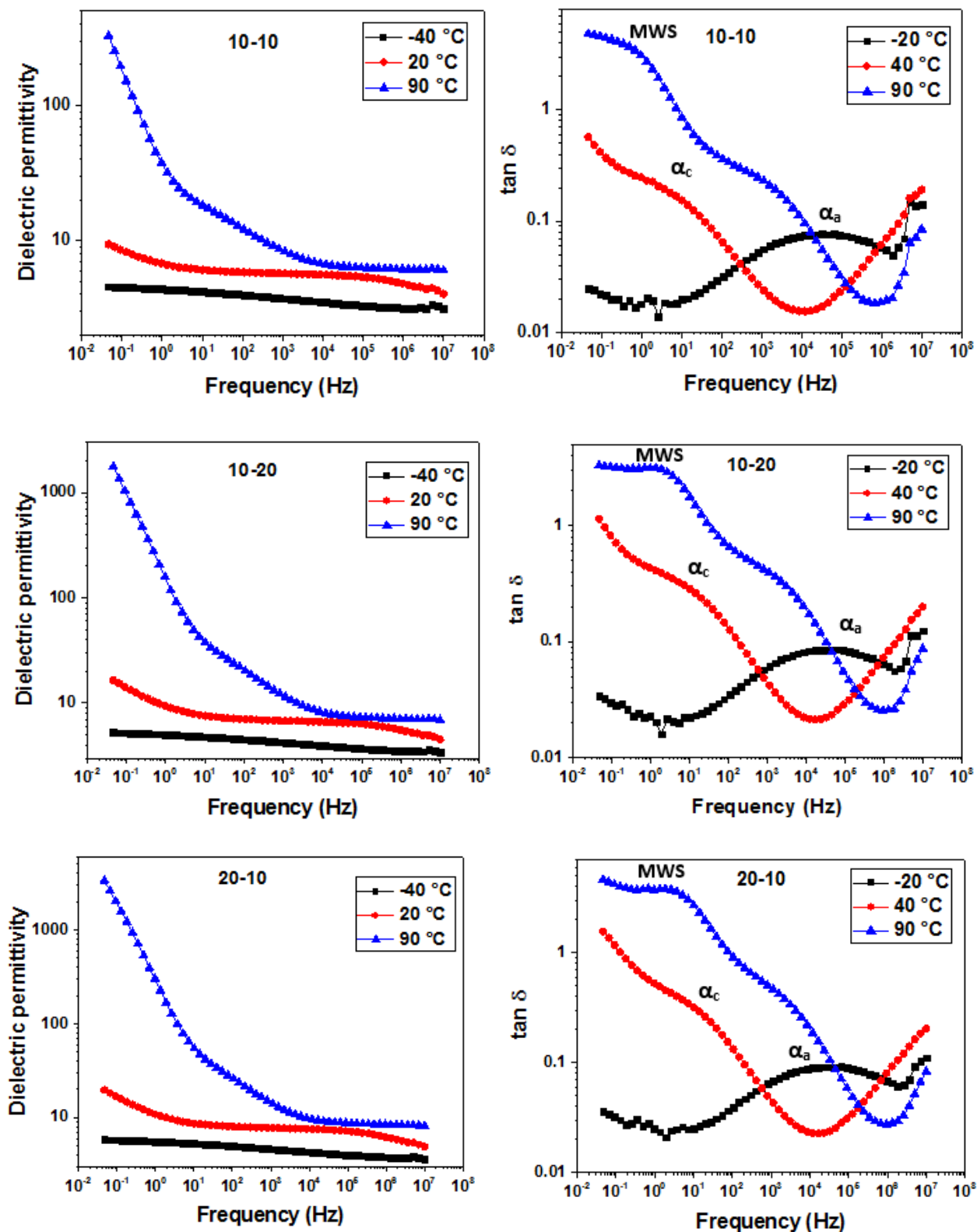


Figure S5. Selected representative isothermal spectra recorder for ϵ' and $\tan \delta$ of the 10-10, 10-20 and 20-10 nanocomposite films.

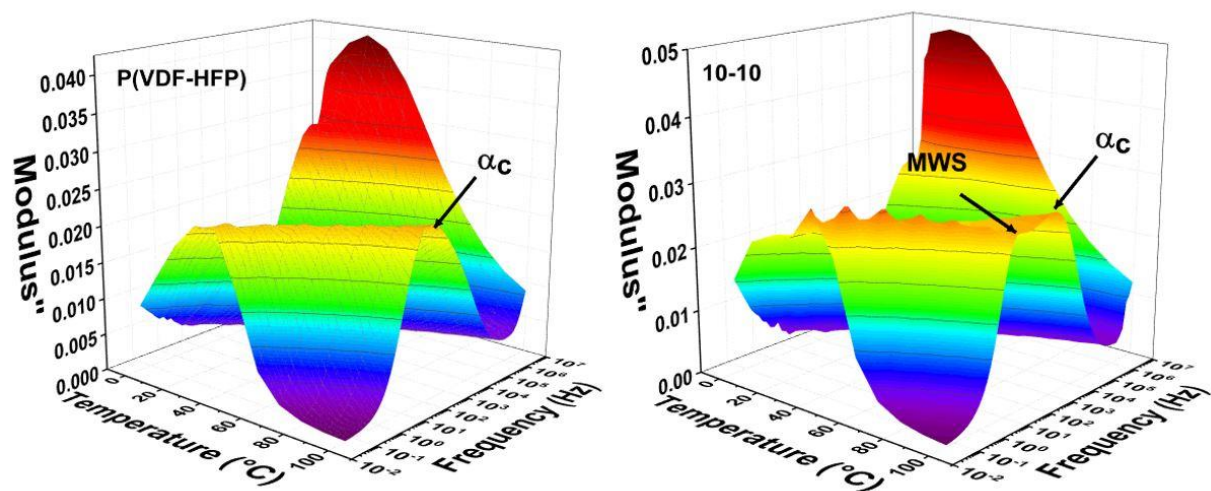


Figure S6. Frequency dependence of the dielectric loss modulus (Modulus'', or M'') of pristine P(VDF-co-HFP) and of its 10-10 nanocomposite film at different temperatures.

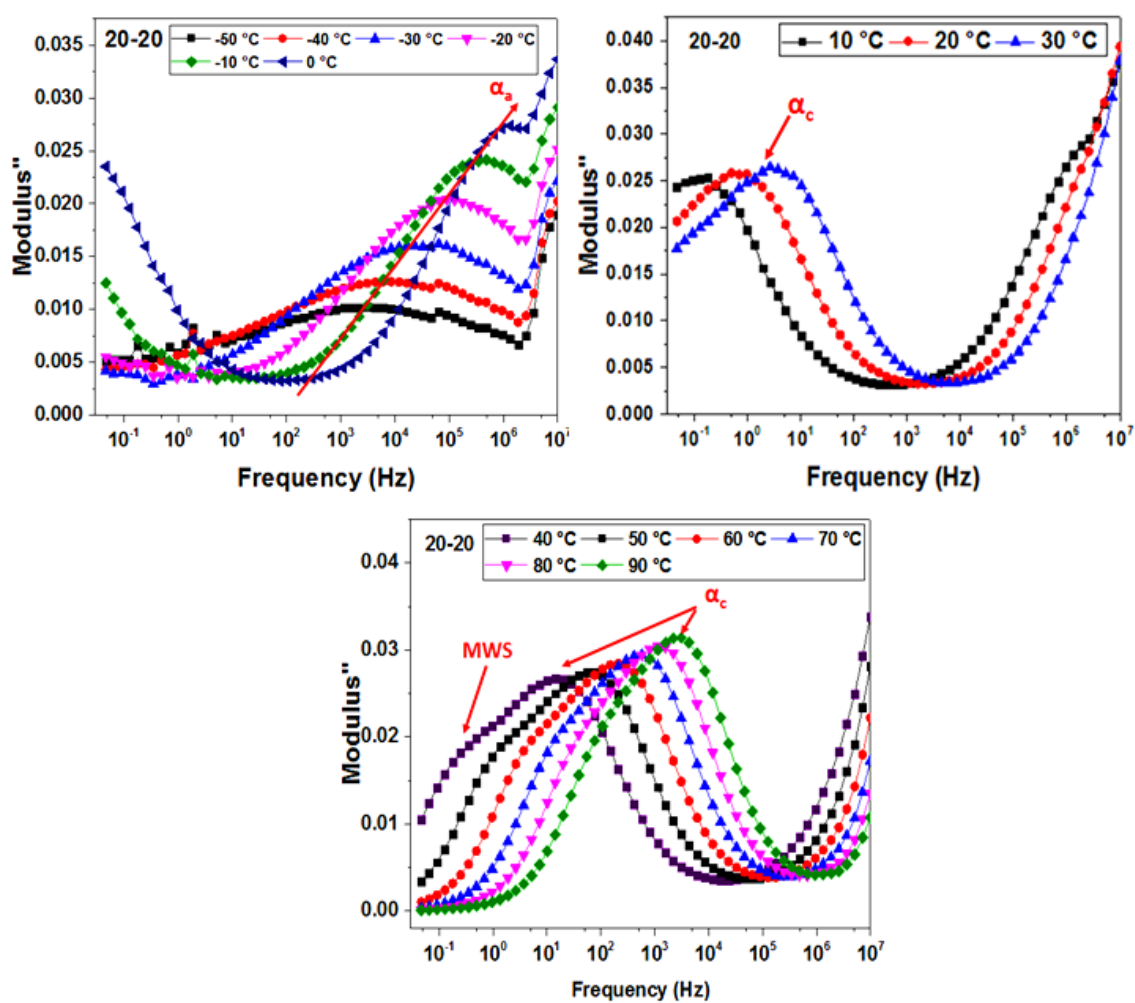


Figure S7. Modulus M'' versus frequency at different temperatures of the 20-20 nanocomposite film.

Reference

- [1] F.E. Bouharras, M. Raihane, G. Silly, C. Totee, B. Ameduri, Core shell structured Poly(Vinylidene Fluoride)-*grafted*-BaTiO₃ nanocomposites prepared via Reversible Addition fragmentation chain transfer (RAFT) polymerization of VDF for high energy storage capacitors, Polym. Chem. 10 (2019) 891–904. doi:10.1039/C8PY01706A.