	Experiment title: Studying the thermal stability of multifunctional nanotextured surfaces prepared by	Experiment number:
Beamline:	Date of experiment: from: 25.08.2017 to: 28.08.2017	Date of report: 1.3.2018
Shifts:	Local contact(s): Daniel Hermida	<i>Received at ESRF:</i>
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Report:

During our beam session at the BM26 beamline, we performed temperature dependence GISAXS measurements on nanostructured thin films (deposited over Si substrates) and surface nanostructured self-standing films, prepared by means of nanoimprinting lithography.

In the first case, during the heating, evolution of the scattering pattern allow to identify the softening temperature of the polymer and polymer nanocomposites (see example in Figure 1) which is estimated to be ca. 20°C higher than the T_g of the corresponding bulk material. There are not significant changes in the softening temperature of the nanocomposites due to the presence of nanoparticles in the textured surface.

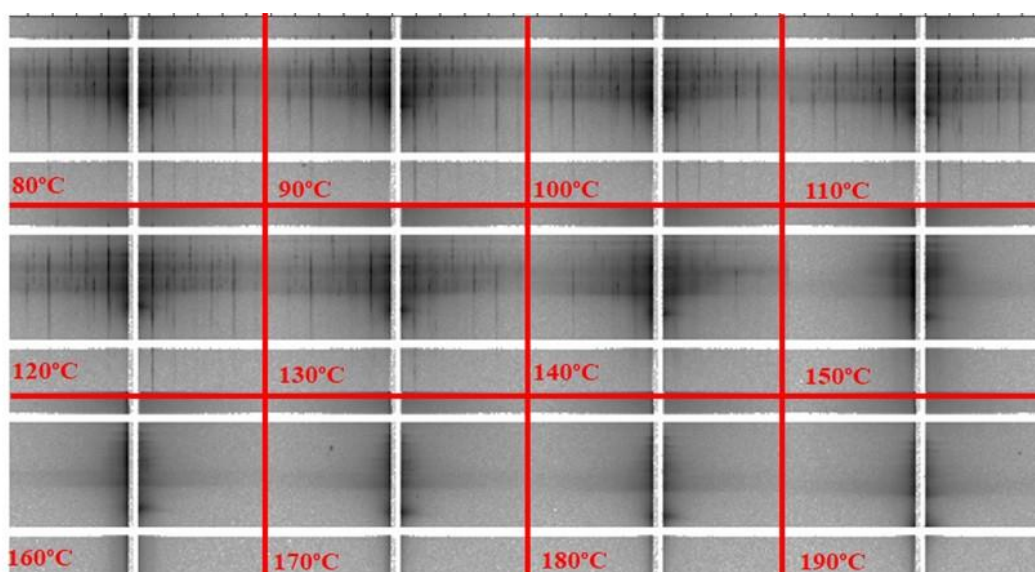


Figure 1. Evolution of GISAXS pattern of nanostructured thin film of PMMA/0.5% TiO₂ nanoparticles

Figure 2 shows results concerning the characterization the surface textured self-standing films of semicrystalline PVDF. In this case the signals corresponding to the GISAXS, T-GISAXS and pure SAXS can be observed coexisting in the patterns obtained during the measurements. During the heating, it can be observed the bulk crystallization of the PVDF, as can be inferred from the increase in the intensity of the halo centered on the direct beam stop. According to the persistence of the GISAXS and, mainly, T-GISAXS signal, the crystallization of the polymer does not affect strongly the morphology of the textured surface until the melting temperature (ca.165°C) is reached.

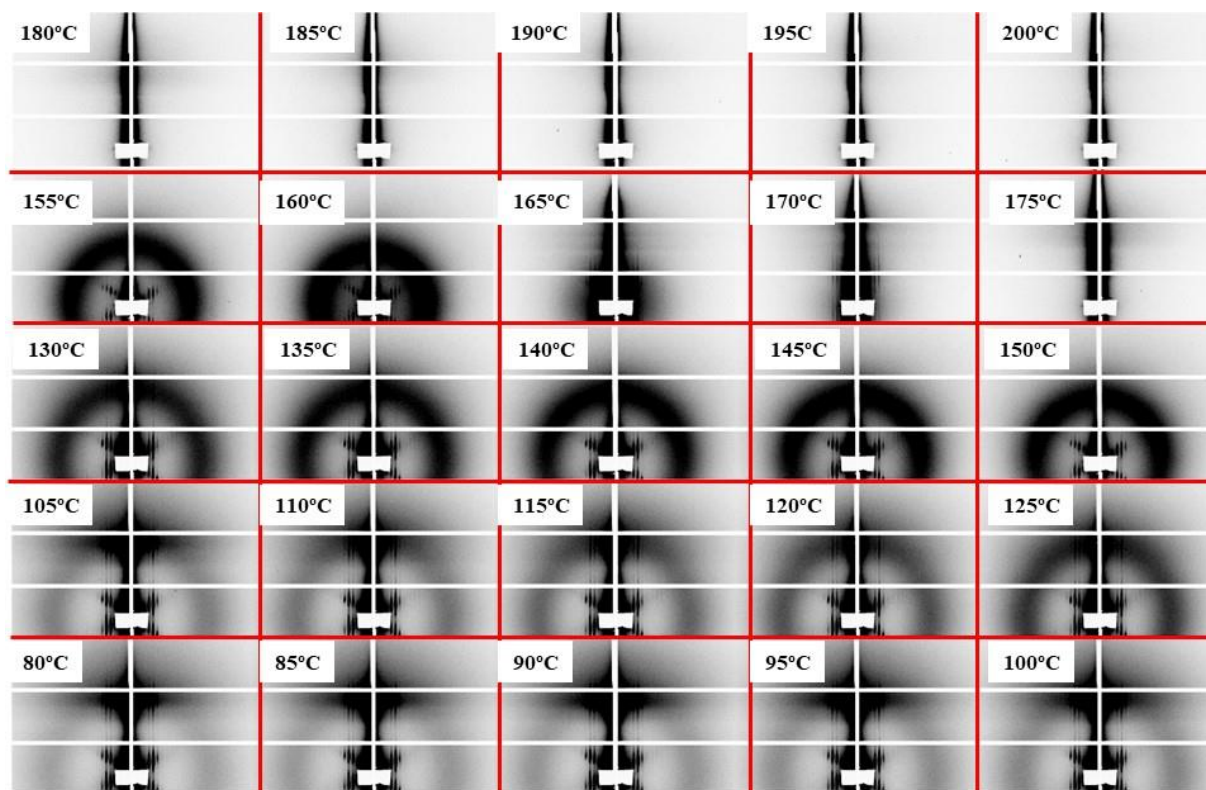


Figure 2. Evolution of GISAXS/T-GISAXS pattern of nanostructured self-standing film of PVDF