Supplementary Information

The IR and XRD spectra of PVDF for different speed and for different draw ratio λ were shown in Fig.1 and Fig.2. The results in Fig.3 in the paper were mainly calculated from the IR spectra of Fig.1(a) and Fig.2(a). It proved that the stretching rate has less effect on the transformation from α-crystal to β-crystal, however the draw ratio affected more and the fraction of β-crystal would also increase and achieve the highest above λ of 3 . The XRD spectra in Fig.1.(b) and Fig.2(b) indicated the similar results with the IR spectra.

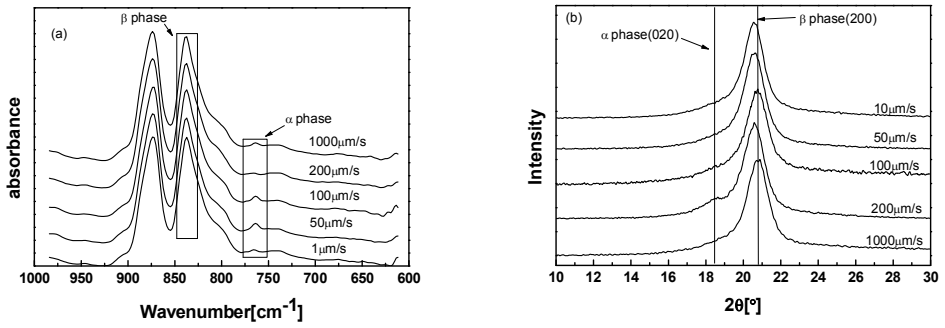

Fig.1 IR, XRD spectra of PVDF for different tensile speed V_s (T_s=100 °C, λ=3): (a) IR spectra; (b) XRD spectra

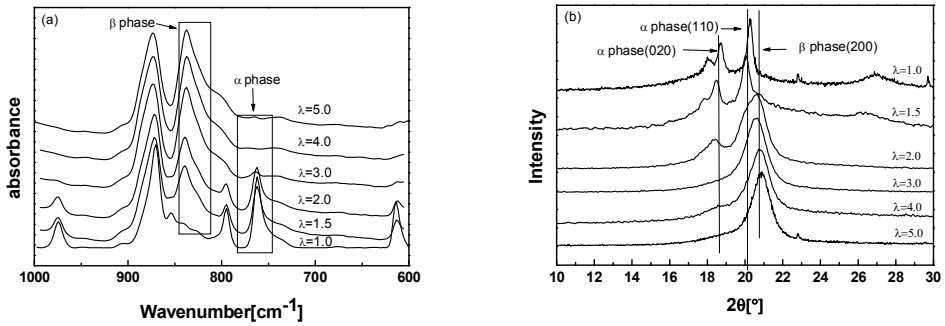

Fig.2 IR, XRD spectra of PVDF for different draw ratio λ (T_s=100 °C, V_s=50 μm/s): (a) IR spectra; (b) XRD spectra

Before that we did the testing in the small deformation sample under the infrared microscope (FTIRI), we observed the large deformation sample with λ=5 and the results were shown in Fig.3. Fig.3-a showed the image of the points on the surface of the sample tested by FTIRI. The left areas of Fig.3-a represented the the tensile part and the right areas were non-stretched part, the black areas of the middle were the areas which the deformation occurs at (the transition areas of stretching and non-stretching). Fig.3-b was the image that combined the contour chart of the β-crystal and the corresponding position on the surface of the sample. The regions that the F(β) was higher were defined as blue color and lower regions were defined as red color. The distribution of the relative degree of crystallinity of β-crystal in Fig.3-b showed that there was large differentiation between the stretching region and the non-stretching region, and there was a clear transition zone between two regions. It also can be seen that almost whole blue region with F(β) exceeded 0.8 is full of the entire field of vision. The large deformation of the sample made the large differentiation of fraction of β-crystal between the stretching region and the non-stretching region and FTIRI would show the same results in Fig.3-b. It proved that FTIRI is a effective method in studying the β-crystal of deformation sample of PVDF.

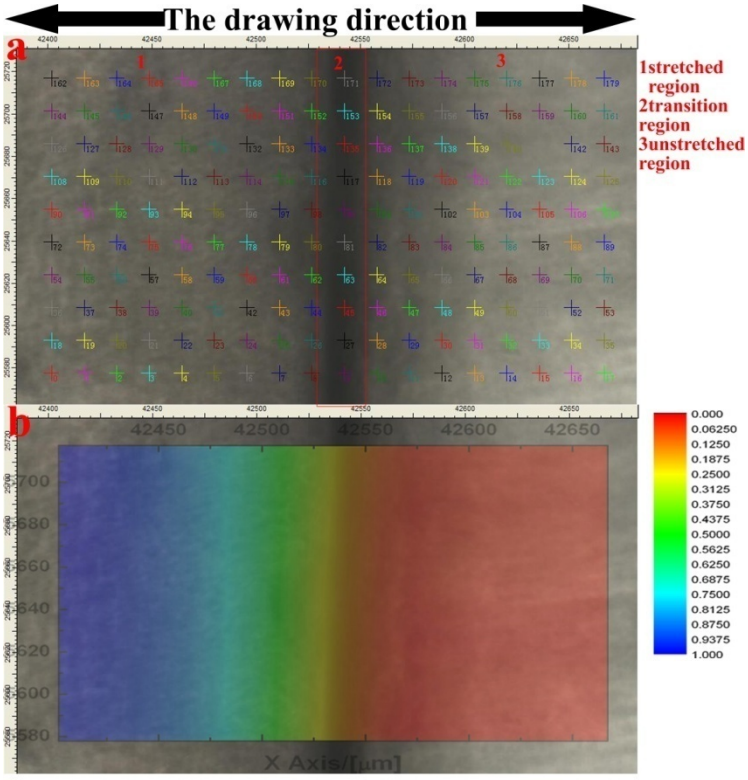

Fig.3 the results of a large deformation sample of PVDF tested by FITRI