Product Description

Test Pattern for the Piezoresponse Force Microscopy PFM_S (piezoelectric single crystal lead PMN-PT)

The sample is intended for:

- Setting the piezoresponse force microscopy (PFM)
- Selection of the optimal parameters (phase and amplitude) in the PFM mode
- Test measurements holding in the PFM mode

Main characteristics:

Material	piezoelectric single crystal lead PMN-PT
Crystal orientation	<001>
Grid type	R3m, Rhombohedral
Phase transition temperature	145 +/- 3° C
Sample size	5x5x0.5 мм

Quick Start Guide

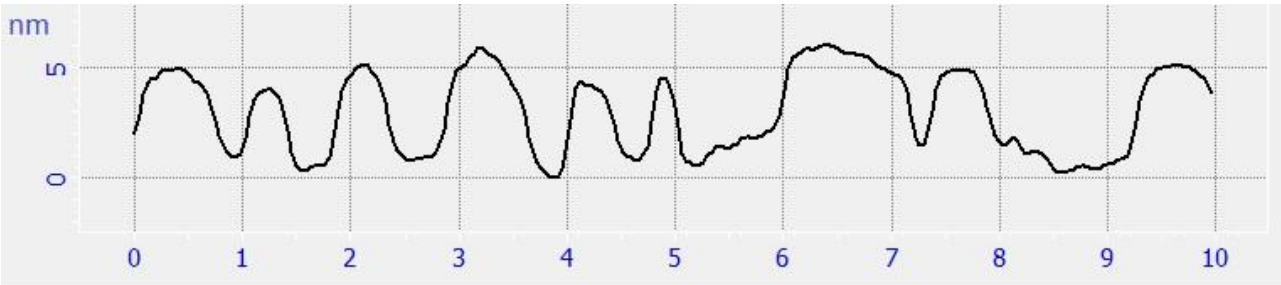
In order for making measurements the sample is fixed on the SPM holder and the bottom electrode of the sample has to be grounded.

The measurements are hold in contact mode. To SPM tip AC voltage is applied with a frequency f_{mod}. The surface of the sample begins to oscillate with the same frequency f_{mod}. This response is analyzed using the lock-in amplifier. In the signal of piezoresponse amplitude the domain walls contrast is observed, and in the signal phase – contrast of the domains.

Topography image in Contact mode

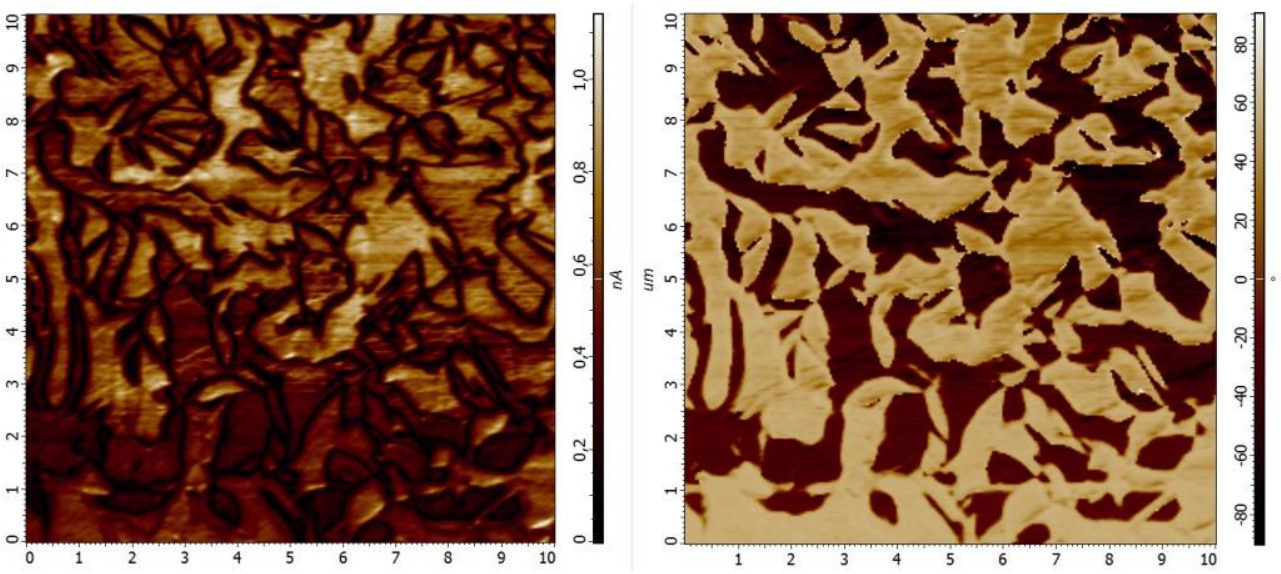
Scan size 10x10 um, 256x256 points

Surface profile

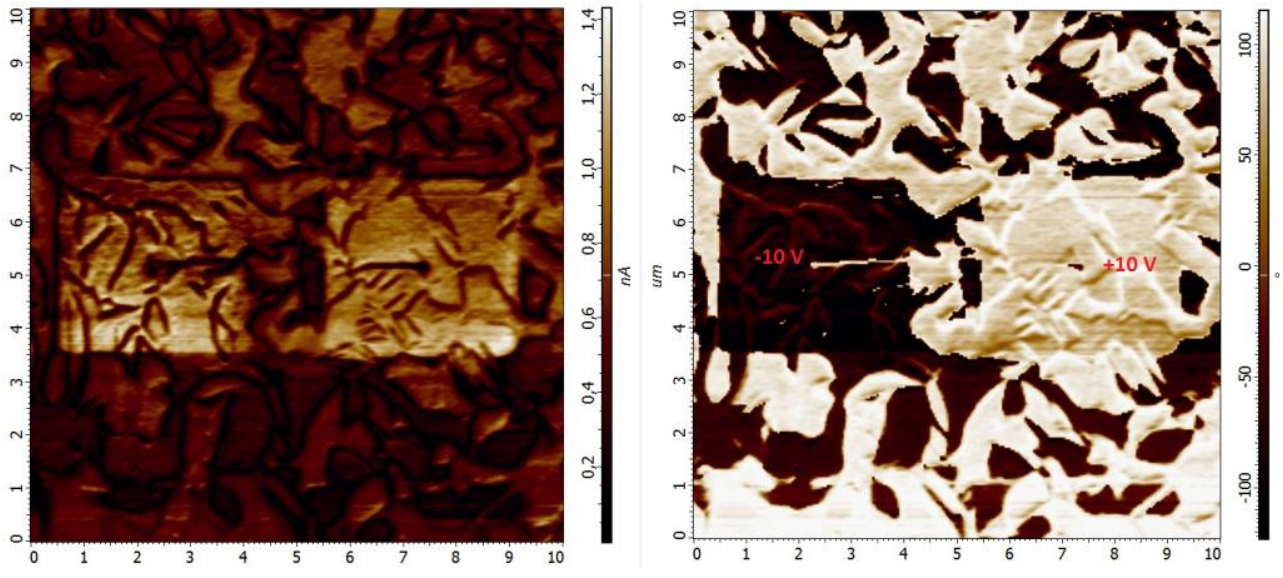


Example of measurement results in PFM mode:

Amplitude and phase of piezoresponse (vertical deflection)



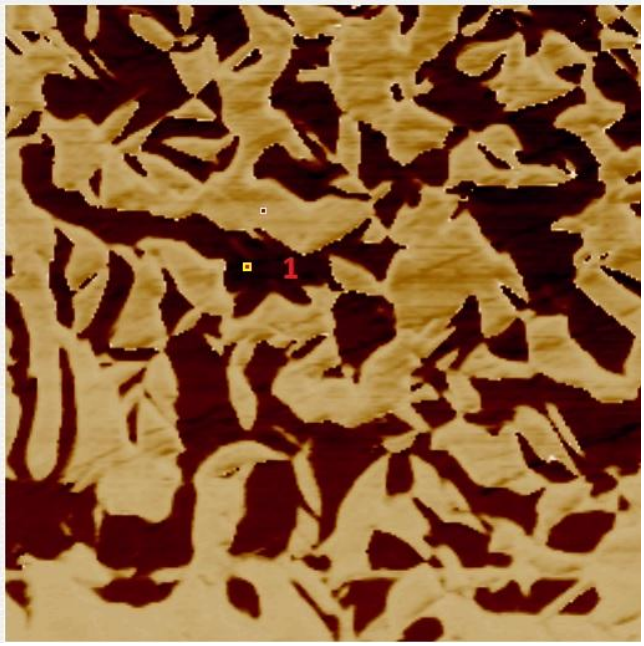
The same scan area after polarization by voltage -10 and +10 V in PFM mode

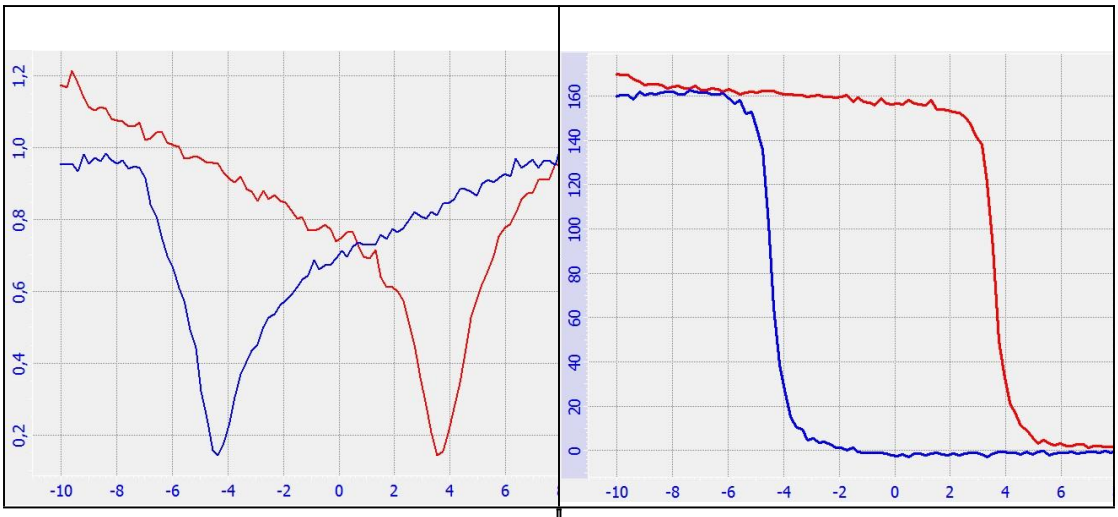


Scan size: 10x10 um. Conductive force modulation tip FMG01/Pt.

AC voltage amplitude 0.3 V, fmod = 470 kHz (contact resonance frequency).

PFM spectroscopy results demonstrating hysteresis loops for point 1:





А) signal amplitude

Б) signal phase