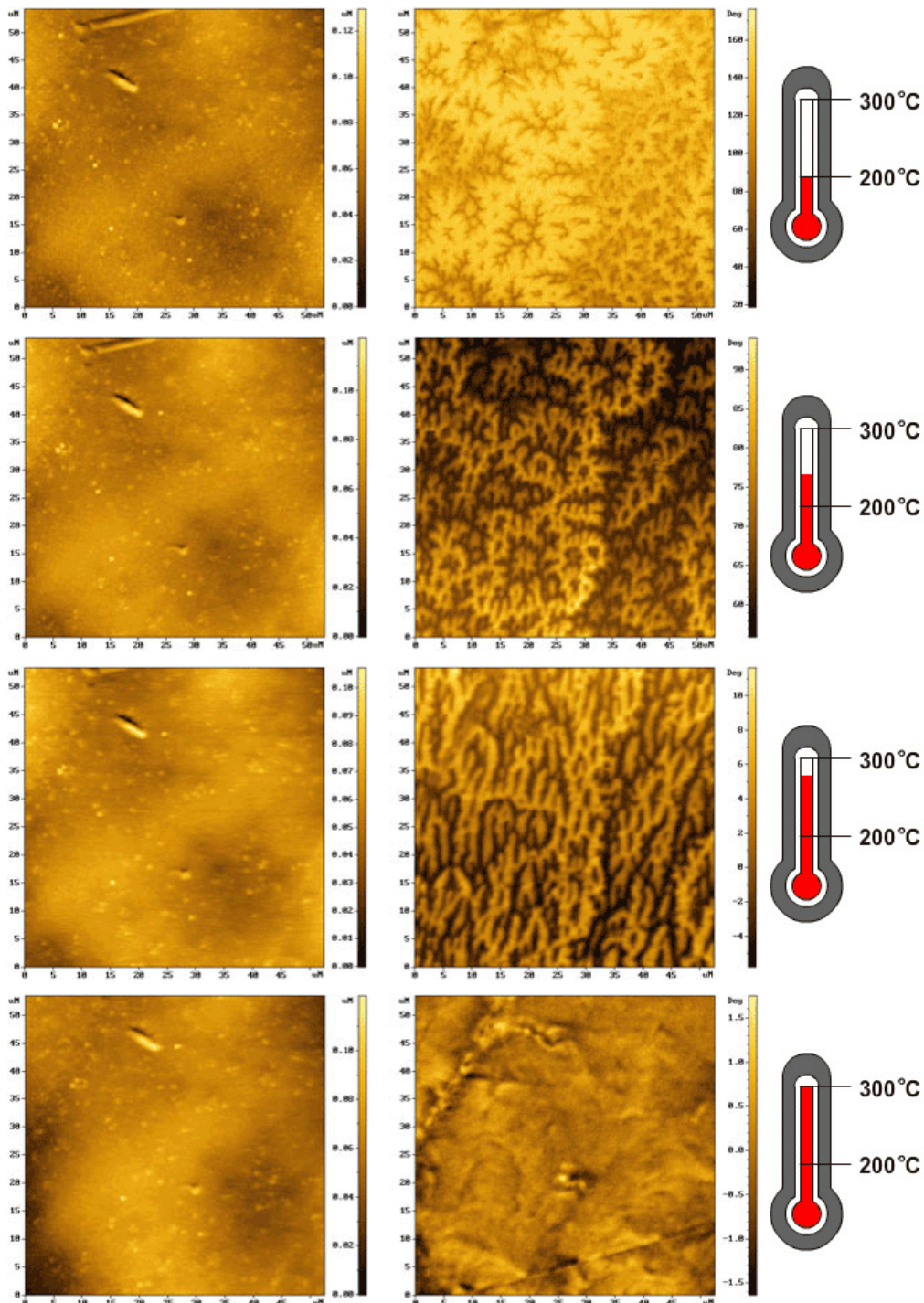


Thermo measurements

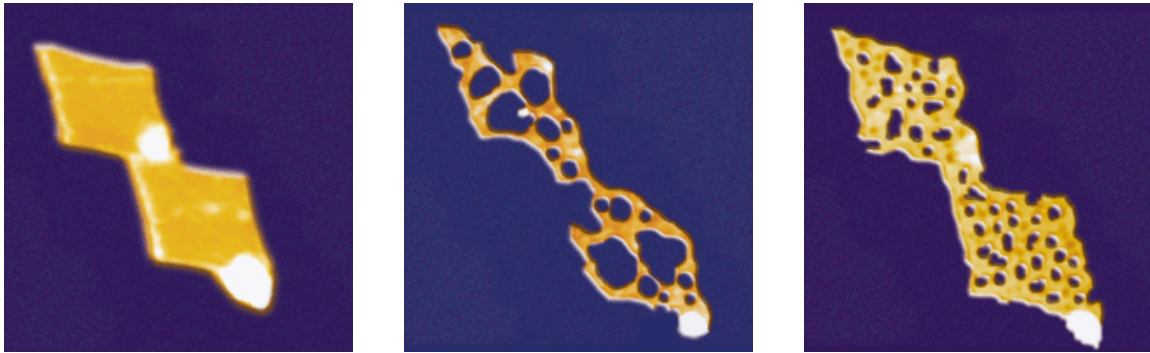
Measurements carried out with heating or cooling of the sample allows studying the changes of sample's properties with the variations of temperature. There are several capabilities of carrying out the investigations with the varying temperatures in the air and in liquids in NT-MDT SI equipment.

The implemented in NTEGRA capability of heating the sample up to 150 °C, 200 °C and 300 °C (depends on the system configuration) allows investigating

structural changes on the sample's surface, such as crystallization, melting or processes of growth.



Domain structure of cobalt monocrystal, uniaxial anisotropy near the point of phase transformation with spin orientation change.



Polyethylene crystal melting visualization.

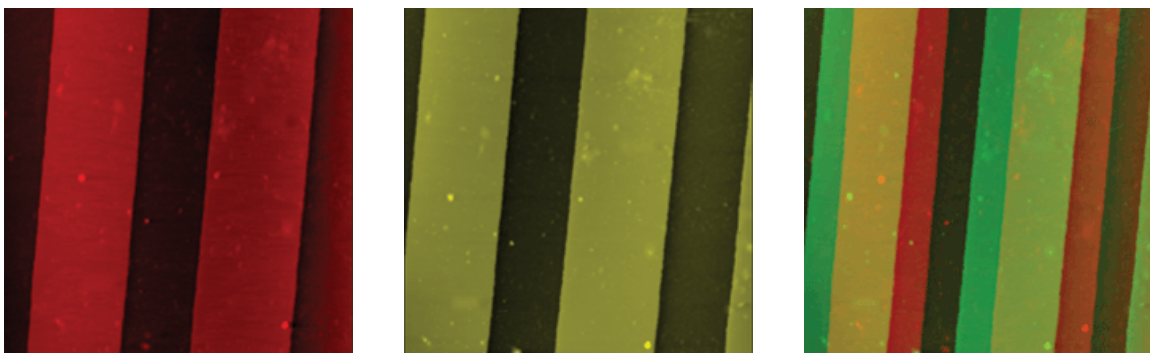
Polyethylene crystal melting visualization. Sequence of the images obtained while heating the sample from the room temperature to 130 °C. Scan size 4.2x4.8x0.06 μm.

In cases when the temperature is needed to be changed during the investigation, the important role is for the thermo drift value – the probe shift relatively to the sample’s surface according to the changing temperature. Special system construction was designed to minimize the thermo drifts in the NTEGRA Therma Probe Nanolaboratory.

Owing to the symmetry of the measuring unit construction, thorough selection of materials taking into

account their coefficient of thermal expansion and because of double contour of inner heat setting the value of the thermo drift in NTEGRA Therma is only 10-15 nm/°C.

In NTEGRA Therma one may change the sample’s temperature from -30 °C to 80 °C, and from the room temperature to 200 °C.



a)

b)

c)

Silicon grating.

(a) Topography image at 28 °C

(b) Topography image at 130 °C

(c) Composed picture consisting of two images (at 28 °C and at 130 °C respectively)

Thermal drift is less than 8 nm/°C

Scan size 7x7 μm