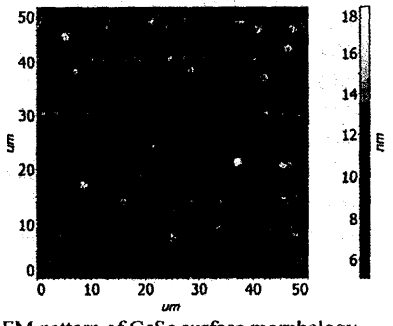
NATIVE OXIDE NANOCRYSTALS FORMATION ON THE GaSe(001) CLEAVED SURFACE

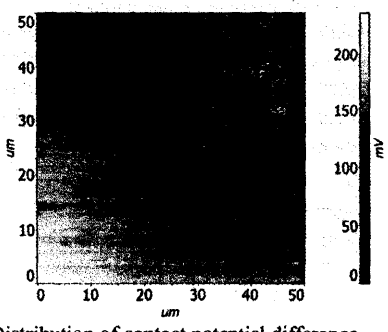
Korotchenko Z.V.[1], Bereznaya S.A.[1], Novikov V.A.[2], Red'kin R.A.[1], Sarkisov S.Yu.[1], Atuchin V.V.[1,3,4]

[1]*Functional Electronics Laboratory, Tomsk State University, Tomsk 634050, Russia*
[2]*Nanolectronics and Nanophotonics Laboratory, Tomsk State University, Tomsk 634050, Russia*
[3]*Laboratory of Optical Materials and Structures, Institute of Semiconductor Physics, SB RAS, Novosibirsk 630090, Russia, atuchin@isp.nsc.ru*
[4]*Laboratory of Semiconductor and Dielectric Materials, Novosibirsk State University, Novosibirsk 630090, Russia*

Gallium selenide, GaSe, is a well-known nonlinear optical crystal for IR and terahertz ranges. Besides many advantages this layered material possesses low mechanical hardness and high density of structural defects. Another problem is that GaSe(001) cleaved surface readily oxidizes and foreign chemical compounds form by the interaction with the humid atmosphere components. This reduces the stability of optical properties of the GaSe elements. On this reason, it is interesting to study the temporal evolution of the oxide formation process and influence of environmental conditions which can be present at optical experiments. In our work, we study the evolution of GaSe native oxide formation using atomic-force microscopy (AFM) methods. It was found that the growth of oxide film is accompanied by work function increase. This increase saturates after several hours exposition.



AFM pattern of GaSe surface morphology.



Distribution of contact potential difference.