P-101

β-glycine piezoelectric and ferroelectric properties behavior at elevated temperatures

S.G. Vasilev[1], D.S. Vasileva[1], P.S. Zelenovskiy[1], V.Ya. Shur[1], A.L. Kholkin[1,2]

[1] *School of Natural Sciences and Mathematics, Ural Federal University, 620000 Ekaterinburg, Russia vasilev.semen@gmail.com*

[2]*Physics Department & CICECO – Aveiro Institute of Materials, University of Aveiro, 3810-193, Aveiro, Portugal*

Investigation of the ferroelectric properties of organic molecular crystals is one of the fundamental problems. Interest in this class of crystals is associated with the possibility of their use in biocompatible electro-optical and electromechanical devices since many of them have pronounced piezoelectric and nonlinear optical properties.

Recent studies of the simplest amino acid glycine (NH_2CH_2COOH) single crystals revealed that among three polymorphic phases α, β and γ formed at ambient conditions, only β-phase possesses both piezoelectric and ferroelectric properties [1]. The faceted crystals with in-plane polar axis were grown from aqueous solution via drop drying on Pt/SiO/Si substrate in air with controlled relative humidity.

The detail experimental study of as-grown domain structure evolution in wide temperature range, domain switching by pyroelectric field and temperature induced polymorphic phase transition in β-glycine microcrystals using atomic force (AFM) and piezoresponse force microscopy (PFM) was realized by scanning probe microscope Asylum MFP 3D SA (Asylum Research, USA).

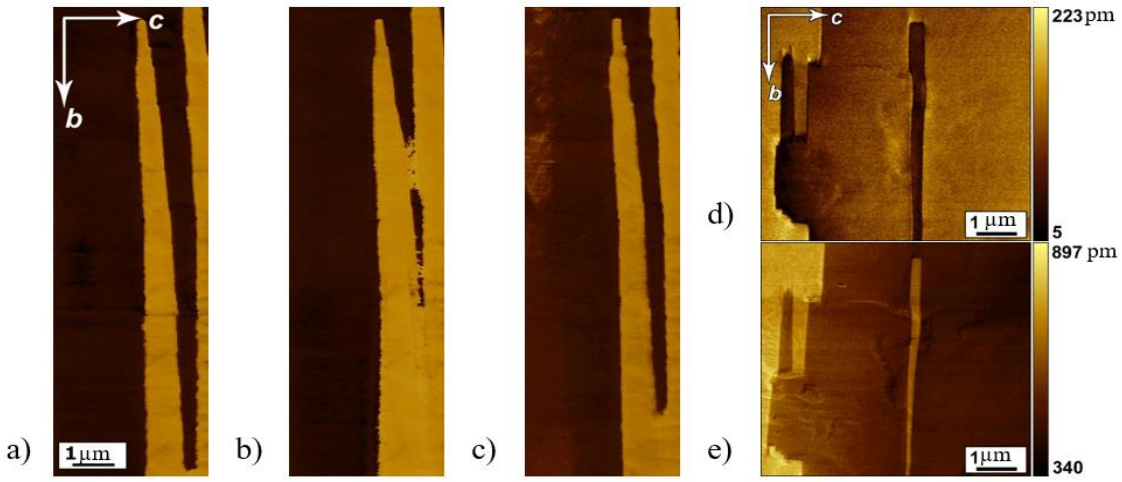

Figure 1. PFM images of the domain structure: (a) as-grown, (b) after heating from 10 to 35°C, (c) after cooling from 35 to 10°C; (d) as-grown and switching before and (e) after phase transition, caused by heating to 50°C.

Switching of the as-grown domain structure by pyroelectric field appeared during heating and cooling and frozen-in domain structure after β→γ phase transition induced by heating up to 50ºC have been obtained (Fig. 1).

The research was carried out using equipment of Ural Center for Shared Use "Modern Nanotechnologies" Ural Federal University. The reported study was funded by RFBR according to the research project № 18-32-00390.

1. A. Heredia, V. Meunier, et al., *Adv. Funct. Mater.* **22**, 2996 (2012).