MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Experiments from Sub-orbital to Orbital Platforms (3)

Author: Dr. Anatoly Bazhenov
Institute of Solid State Physics, Russian Academy of Sciences (RAS), Russian Federation, bazhenov@issp.ac.ru

Dr. Valery Orlov
Institute of Solid State Physics, Russian Academy of Sciences (RAS), Russian Federation, orlov@issp.ac.ru
Dr. Mikhail Maksimuk
ISSP, Russian Federation, maksimuk@issp.ac.ru
Prof. Vitaly Kveder
Institute of Solid State Physics, Russian Academy of Sciences (RAS), Russian Federation, kveder@issp.ac.ru
Prof. Arne Croell
Kristallographisches Institut, University of Freiburg (KI FU), Germany, arne.croell@krist.uni-freiburg.de
Ms. Annia Greif
Institut für NE-Metallurgie und Reinststoffe, TU Bergakademie Freiberg (TU BAF), Germany, Annia.Greif@inemet.tu-freiberg.de
Dr. Olf Pätzold
Institut für NE-Metallurgie und Reinststoffe, TU Bergakademie Freiberg (TU BAF), Germany, olf.paetzold@inemet.tu-freiberg.de
Dr. Alexander Senchenkov
Research and Development Institute for Launch Complexes (NIISK), Russian Federation, senchenkov@rambler.ru
Mr. Alexander Egorov
Design Bureau of General Machine-Building (KBOM), Russian Federation, egorov@kbom.msk.ru

SPECIFIC FEATURES OF DISTRIBUTION OF GA IN GE SINGLE CRYSTALS GROWN UNDER MICROGRAVITY CONDITIONS

Abstract

We have studied and compared Ga-doped single crystals of Ge grown by the Bridgman method in microgravity conditions during the Foton-M3 space mission and those grown on the identical apparatus under the normal gravity conditions on the Earth (reference samples). The distribution of Ga in the crystals was studied using the Time of Flight Secondary Ion Mass Spectroscopy (TOF SIMS), Raman scattering, and local resistivity measurement by the four-point technique. The SIMS and Raman scattering measurements show a significant difference in Ga concentration in reference samples and those grown under microgravity. In the central part of the sample grown under microgravity the average concentration of Ga is higher by a factor of 2.5 against that in the reference sample. At the same time, the concentration of electrically active Ga measured by local resistivity method is about the same in both samples. This may be associated with specific features of the structural state of Ga and its non-uniform micro distribution in the samples grown under microgravity. The SIMS measurements with a high spatial resolution indeed show a large number of small "islands" with a very high Ga concentration in "microgravity" samples. The typical size of these "islands" is of about 10 microns in size. These "islands" are likely to be Ga-

containing precipitates. Possibly, the absence of the convective fluxes under the microgravity conditions favors precipitation of Ga.