

Nanostructured surfaces

Formation of nanoscale InAs objects on the surface of GaAs during rapid cooling of substrate by LPE

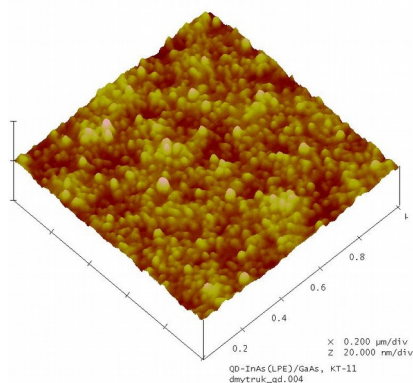
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Formation of InAs quantum dots on the surface of GaAs by LPE is an actual method in terms of the formation of high-quality active regions for optoelectronic devices without shorting layer [1,2]. This layer is usually formed by Stranski-Krastanov model or by using gas phase or molecular beam epitaxy methods[3]. Liquid phase epitaxy method provides formation of quantum dots on the surface of the substrate or epitaxial layer in case of pulse controlled cooling phase boundary of the interface semiconductor substrate /solution-melt.

In work are the theoretical calculations of the growth and experimental study of impact of different technological modes of creating sharp supercooling interface GaAs substrate - /solution-melt In-InAs on the kinetics of formation of quantum dots in the active layer of AlGaAs photovoltaic solar energy cell.



The influence of the magnitude of supercooling melt on the size, the quantity and the uniformity of the formed InAs quantum dots is investigated. Fig. 1 demonstrates the photo of InAs quantum dots on GaAs surface obtained in one of the technological regimes. It was determined that the optimal range of technological formation of InAs quantum dots on GaAs surface and growth of AlGaAs solid solution layer occurs at temperatures of 600-480 ° C.

1. *Марончук И.Е., Марончук А.И., Шорохов А.В.* Наноразмерные слои GaAs, полученные при импульсном охлаждении насыщенного раствора-расплава // Письма в ЖТФ. – 1997. – Т.21, В. 20. – С.13-16.
2. *Уфимцев В.Б., Акчурич Р.Х.,* Физико-химические основы жидкофазной эпитаксии, 1983.
3. *Venables, John; G. D. T. Spiller; M. Hanbucken* Nucleation and growth of thin films // *Reports on Progress in Physics*.- April 1984, **47**(4): 399–459.