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«Английский язык для специальных целей (естественно - научные дисциплины, физико-технические дисциплины и программирование)»

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ПРОГРАММНАЯ ОБРАБОТКА И АНАЛИЗ ИЗОБРАЖЕНИЙ КВАНТОВЫХ ТОЧЕК
SI/GE, ПОЛУЧЕННЫХ ПРИ ПОМОЩИ АТОМНО-СИЛОВОЙ МИКРОСКОПИИ.
PROGRAM PROCESSING AND ANALYSIS OF THE QUANTUM DOTS SI/GE DEPICTION
RECEIVED BY ATOMIC - FORCE MICROSCOPE

Целью данного исследования является анализ двух фотографий, сделанных при помощи атомно-силового микроскопа, на которых изображены поверхности двух полупроводников с квантовыми точками, выращенными в процессе молекулярно-пучковой эпитаксии при разных технологических режимах. Зная масштаб, требовалось определить основные параметры синтезированных квантовых точек. На основе полученных данных требовалось сравнить и сделать выводы об условиях синтеза квантовых точек в двух технологических режимах с точки зрения получения однородности размеров и формы нанобъектов, а также их плотности.

The interest to the research of quantum dots has increased lately. Quantum dots are considered to be zero- dimensional or quasi-zero- dimensional structures. It means that they are the representatives of the class of low-dimensional systems. The distinctive properties of such systems depend on their dimension and form, and these are their characteristic features. The unique physical properties of semiconductor quantum dots found and studied mainly by optical means stimulated the development of manufacturing technology. Nowadays scientists can construct low-dimensional systems of high qualities with pre-defined properties by means of nanotechnologies. This has brought to life the improvement of the nana-dimensional systems that are used in different spheres of human activities from electronics to biology and medicine. Ge and Si are the most widely studied and frequently used elements for manufacturing semiconductors. The interest for nanoclusters Ge and Si is connected with the following circumstances:

- success in the technology of fairly uniform size of nanoclusters Ge and Se array development;
- nanoclusters size reducing ability to the values providing quantum size effects manifestation and electronic interactions up to room temperature;
- the developed methods compatibility with the existing silicon technology of discrete devices and circuits manufacture [1].

Our task consisted in analyzing two photographs made by means of the atomic– force microscope. They represent the surfaces of two semiconductors with quantum dots, grown in a process of

molecular-wisp epitaxy at different operating regimes. We were to define the following main parameters of synthesized quantum dots:

- their total number on the photographs;
- the average linear dimension of the array of quantum dots on the OX and OY axes;
- the distribution of the areas of quantum dots;
- the density of the surfaces of quantum dots;
- the number of the quantum dots orientated along OX and OY axes (stretched out in horizontal or vertical direction);

For treatment of the photographs received by means of the atomic-force microscope not to consider values manually, the program in Delphi's environment has been worked out by our team. It calculates all the necessary data and at the same time re-draws these photographs for further work. Based on the data obtained it was required to compare and draw the conclusion about the quantum dots synthesis conditions in two technological regimes from the point of view of getting the size and shape uniformity as well as the density of nano-objects. This information, in particular, is necessary to determine the sphere of application of the structure with a definite array of quantum dots.

ЛИТЕРАТУРА

1.Федоров А.В., Рухленко И.Д. и др. Оптические свойства полупроводниковых квантовых точек. - СПб: Наука, 2011.- с.7-44.

интерактивных технологий при коммуникативном обучении иностранному языку значительно повышает качество подачи материала урока и эффективность усвоения этого материала учащимися. Мультимедийные технологии подразумевают использование таких аудиовизуальных и интерактивных средств обучения как: 1. программные средства (мультимедийные диски, презентации, видео -, аудио- ролики, ресурсы сети Интернет); 2. оборудование (ПК, аудио-, видео- аппаратура, мультимедийный проектор, интерактивная доска).

В докладе будут подробно рассмотрены некоторые основные аспекты, касающиеся проблемы создания интерактивной среды.

Секция «Английский язык для специальных целей (естественно - научные дисциплины, физико-технические дисциплины и программирование).

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РАСПОЗНАВАНИЕ МОДЕЛИ И МАРКИ МАШИНЫ ПРИ ПОМОЩИ ПОИСКА ПО ИЗОБРАЖЕНИЯМ. VEHICLE MODEL AND MAKER RECOGNITION BASED ON IMAGE RETRIEVAL.

Целью настоящей работы является разработка прототипа системы распознавания модели и марки машины. Подобное распознавание может быть осуществлено путём сопоставления фото или видео с большим архивом изображений автомобилей, для которых марка и модель известны. Задача сопоставления с большим архивом изображений (визуальный поиск) активно исследовалась в последнее десятилетие, однако представленные системы не применялись к проблеме распознавания модели и марки машины.

The goal of this work is to develop prototype of vehicle model and maker recognition system by computer vision techniques. Computer vision is a part of artificial intelligence. The methods used here are directed to extract information from image or images sequence, and the further processing of obtained information. For example, recent digital cameras are equipped with facial recognition technology which can be used for automatical frame adjustment. That's computer vision.

Most of the current computer vision systems are aimed to detect whether a car is presented on an image (or video record) or not, to track down a car movement and to recognize a car license plate. The task of MMR (model-maker recognition) is to acquire the higher level of information that