J Nanomed Nanotechnol 2016, 7:4 (Suppl)
http://dx.doi.org/10.4172/2157-7439.C1.041

9th Nano Congress for Next Generation

August 01-02, 2016 Manchester, UK

Multifunctional oxides: Smart bulk and ordered sub nanostructures

Nicolay A Kulagin
Firma SIFA, Ukraine

The results of experimental and theoretical study of bulk and ordered nano-structures on surface of directly changed in stoichiometry composition oxides over plasma flow have been discussed in this report. Tested samples, such as -Al2O3, MexOy single crystals (oxide of iron group elements) samples with garnet structure, A3B2C3O12 and perovskite one, ABO3 as perfect or doped with Me or/ and RE ions were grown under special conditions. Pure and doped perfect or near stoichiometry samples were studied with optical/ spectroscopy methods, ESR, high resolution X ray spectroscopy, XRD, dielectric, conductivity, AFM, SEM, TEM techniques, before (after) annealing in oxidizing and reducing atmosphere or/and γ- or e- - irradiation affect and over high density plasma flow. Strong change in the ground properties of the samples was fitted and discussed. Ordered and quasi-ordered one- and multi-level nano and sub-nanostructures were discovered on the surface of the oxides after intensive plasma treatment. Exemplary SEM-AFM showed two-level ordered nano-structures on the surface of SrTiO3 and sapphire single crystals over plasma affect. Distorted surface layers of perovskites are polycrystalline in opposite to amorphous ones for sapphire or garnet crystals. The initial and treated samples were tested by standard and original methods of determination of the doped ions concentration, oxidation state of the host and impurity ions, stoichiometry, and crystallographic parameters, too.

newbook@nakulagin.info

Quantum nanoparticles doped polymer waveguides for light propagation

Parva Chhantyal
Laser Zentrum Hannover, Germany

High-refractive-index polymer hybrid materials, such as OrmoClear show interesting properties for a variety of potential applications. When doped with quantum nanoparticles, this hybrid polymer promotes enhanced optical properties that can have huge advantage in photonic applications. The particle size and composition of these quantum nanoparticles can be tuned in order to introduce new properties to the materials. For an experimental evaluation, the comparative studies of different quantum nanoparticles, such as dots, rods and plates were made. The continuous films of all three kinds of quantum nanoparticles were produced and the fluorescence spectra were measured. In comparison between different quantum nanoparticles, the quantum rods showed brightest emission. Afterwards, these quantum nanoparticles were embedded into a high-refractive-index photocurable OrmoClear in order to produce waveguide structures by photolithography technique. The lasing potential of the doped polymer was evaluated by investigating the efficiency of the light propagating through the waveguide. The optical properties were evaluated based on the concentration of the quantum nanoparticles as well as the structural parameters of the polymers.

p.chhantyal@lzh.de