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Directly change in crystallographic structure, oxidation state of doped or/and component ions increasing spectral, dielectric and conducting properties in oxides grown and treated with different conditions has been discussed. Selected oxide single crystals with chemical formulas as AO, A_2O_3, ABO_3, A_3B_2C_3O_{12} were taken into account [1- 2]. Pure and doped with Me/RE ions single crystals were treated additionally by intensive plasma flow for appearance of ordered nano- and sub-nano-structures on the samples surface [3 - 4]. The efforts focused on study of electronic structure and spectral properties of the bulk crystals and properties of the ordered one- and two-level nanostructures with size of about 10^{-6} \text{-} 10^{-10} \text{ m}. The changing properties of the oxides studied on background of ab initio theoretical approach [1 - 2].

The main results studying the bulk crystals and surface of the samples before and over treatment by spectral (absorption, luminescence, etc. nd ESR) and AFM, SEM, TEM images, XRD structure analysis and high resolution X ray spectroscopy were analyzed, too. Exemplary, ordered sub-nanostructure and giant increasing luminescence intensity, in SrTiO_3 have been clasiffied.

Recent data in changing properties of oxides and possible applications presented in [4 -5] have been discussed in detail.

**Keywords:** nanostructures, oxides, doping ions

**References:**


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