

Near - cluster radiation color centers in crystals



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Pure and doped dielectric crystals with intrinsic radiation-induced point defects are widely used in different technologies. In this work samples of crystals in the form of powders with the sizes of grains less than 1 micron and the pressed tablets were investigated. The structure of nanocrystals which are made by mechanical fragmentation of crystals was investigated by transmission electron microscopy. They were irradiated by gamma quanta at 77K or electrons at room temperature. The radiation color centers formed in a near-clusters region of nanocrystals were studied. Absorption, luminescence and luminescence excitation spectra of the defects have been measured. It has been found that the luminescence excitation spectra for aggregated near-clusters color centers consist of two or three bands with not very much different intensities. Reactions of the near-clusters centers separately with electrons and with anion vacancies have been investigated. Results of pre-irradiation annealing influence on efficiency of formation of the near-surface color centers in nanocrystals are presented. Zero-phonon lines have been registered in photoluminescence spectra of near-clusters color centers in lithium fluoride nanocrystals. Measurements of photoluminescence and thermoluminescence glow peaks for dosimeter TLD-100 as well as for nanocrystals prepared from these dosimeters were carried out. The differences were established.

Biography:

Education - 2012 Doctor of Physics (Optics, Laser Physics), Professor, 1984 Candidate of Science degree in Physics and Mathematics at Institute of Physics of the Academy of sciences of Belarus, 1973-1978 Master degree (with honors) in Physics, Byelorussian State University (Minsk). Professional record - 2015 - present time Head of the Center of photonics of molecular and atomic structures, Institute of Physics, 2000 - 2015 Principal Research Scientist, Institute of Physics, 1991 - 2000 Leading Research Scientist, Institute of Physics, 1988-1991 Senior Staff Research, Institute of Physics, 1978-1988 Staff Research Physicist, Institute of Physics. 270 research publications, 17 patents.