Kinetic Phosphorescence of Ceramics ZnS-Cu from a Doze of a Proton Irradiation

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Was studied kinetic of the light sum accumulation at an isothermal mode after an irradiation by protons of ceramics ZnS-Cu by dozes 1014, 1015p/sm2 with energy 50 Mev. The excitation luminescence and the light sum accumulation were carried out by integrated study x-ray tube (Mo, 35кV, 10 mA) at temperature 85K. In work the method accumulation of the light sum is used at increase of time of excitation. The method allows qualitatively estimating changes in system of local levels of samples.

The researches stationary luminescence have shown, that at an irradiation of initial samples the doze 1014p/sm2 observes increase of intensity roentgen luminescence (RL) and the size reserved the light sum under a curve phosphorescence (Ph) grows. The fall of intensity RL and strong reduction reserved the light sum under a curve Ph is characteristic for samples irradiated by a doze 1015p/sm2. For all three sets of samples experimental dependence's of recession of intensity Ph after the first minute of attenuation is satisfactory approximation by hyperbolic dependence. After an irradiation of ceramics by protons has changed kinetic radiation relaxation Ph. The increase of a parameter of a degree hyperbola α = **Ln(J) / Ln(t)** is established, for the irradiated samples, where **J** - intensity Ph, **t** - the time of registration Ph, from time of excitation, in an initial sample α decreases with increase of a degree of excitation. The received dependence's of rate of accumulation the light sum (**t**) during an interval of registration Ph testify to participation in attenuation of two grades of traps differing on the mechanism radiation of transitions. And, the presence of radiating defects differently changes processes of the light sum accumulation on these grades of traps. For initial sites Ph τ depends on time of achievement of saturation Ph and size of intensity RL, it is supposed that this grade of a trap is a part of a uniform complex responsible for "green" a luminescence in ZnS-Cu. The character of change τ for the second grade of traps explains by increase of channel recombination after a proton irradiation. The reduction increase of values τ for samples irradiated by a doze 1014p/sm2 contacts to increase of concentration interstitial of zinc (Zni) responsible for long low- temperature Ph. For samples irradiated by a doze 1015p/sm2 the received values t are explained by possible displacement Zni in regular places, that is reduction of concentration Zni and vacancies S. The fall radiation of ability of samples irradiated by a doze 1015p/sm2 is explained by occurrence of the center's nonradiative recombination.