

Electronic and ionic processes in LiF:Mg,Ti and LiF single crystals

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Thermally stimulated luminescence (TSL, 5–750 K) and the annealing of induced optical absorption have been investigated in LiF:Mg,Ti and pure LiF single crystals irradiated at 5–295K by electrons, X-rays, α particles, uranium swift ions and especially VUV radiation selectively forming anion excitons, electron-hole pairs and excitations localized near impurity centres. It is shown that besides electron-hole processes, the interstitial-vacancy (ionic) ones should be taken into account. The irradiation of LiF and LiF:Mg,Ti at high fluxes and fluences leads to the appearance of the TSL peaks at 570–630K by a two-step process: thermal dissociation of two types of F_3^- trihalide molecules and sequent recombination of the products of this dissociation with intrinsic and impurity electron colour centres. The origin of some TSL peaks at 5–750K is discussed.