

Effect of electronic energy loss and irradiation temperature on color-center creation in LiF and NaCl crystals irradiated with swift heavy ions

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LiF and NaCl crystals were irradiated at 8 K and 300 K with various light and heavy ions (C, Ti, Ni, Kr, Sm, Au, Pb, and U) of kinetic energy between about 50 and 2600 MeV, providing electronic energy losses from 0.7 to 26.4 keV/nm. A cryostat installed at the beamline allowed *in situ* absorption spectroscopy and thermostimulated luminescence (TSL) measurements from 8 K upward. Creation of electron and hole color centers is analyzed as a function of irradiation temperature, fluence, and thermal and optical bleaching. Anion interstitials (*I* and *H* centers) were only observed in crystals irradiated at 8 K. These defects are unstable and disappear in the temperature range 10–100 K. For heavy ions (Au, U), the *F*-center accumulation efficiency at low fluences is larger at 8 K than at room temperature. The opposite effect is observed for light ions (C, Ti, Ni). The results are discussed within the frame of transient heating influencing separation or annealing of point defects.