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Absorption and Enhanced Photorefractive Beam Fanning in Sn2P2S6:Sb DEAN EVANS, SERGEY BASUN, Air Force Research Laboratory, LARRY HALLIBURTON, West Virginia University, ALEXANDER GRABAR, Uzhgorod National University, YAROSLAV SKRYPKA, ALEXANDR SHUMELYUK, SERGUEY ODOULOV, National Academy of Sciences — In this work, we discuss new effects in ferroelectric/photorefractive Sn2P2S6:Sb (SPS:Sb) that are explored in great depth in order to obtain a fundamental understanding of the photo-induced absorption and enhanced photorefractive beam fanning dynamics, spanning ten orders of magnitude in time (ns to sec). Both temperature and intensity dependence studies are conducted to assist in identifying which processes are thermally driven vs. optically driven, and we compare undoped and Sb doped crystal to determine which of the processes are the result of intrinsic vs. extrinsic defects. Through the use of electron paramagnetic resonance (EPR) measurements, the observed optical processes are assigned to specific defects. Furthermore, both optical and photo-EPR results are used to determine the activation energies associated with the effects (i.e. photo-induced absorption decay and beam fanning build up and decay). Finally, models/energy level diagrams are determined for the photo-induced absorption and the beam fanning transient enhancement effects; these optical effects are assigned to the observed intrinsic and extrinsic defects.

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