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Effect of Stoichiometry and Absorption on Self-Pumped Two-Beam Coupling Gain and Photovoltaic Fields in $LiNbO_3$:Fe HANS BANERJEE, GARY COOK, AFRL, PARTHA BANERJEE, Univ. of Dayton, SERGEY BASUN, JENNIFER CARNS, AFRL, BARRY WECHSLER, MICHAEL SCRIPSICK, Crystal Genesis, DEAN EVANS, AFRL — The variation of self-pumped two-beam coupling gain in $LiNbO_3$:Fe crystals is investigated, using a CW Verdi 532 nm laser, as a function of absorption coefficients, α, and stoichiometry. The 81 crystals tested contain either 0.02% or 0.05% Fe concentrations and are either stoichiometric, intermediate, congruent, or Li deficient. These compositions include a range of α varying between 0.1 and 16 cm^{-1}. Experimental coupling efficiency results exhibit a dependence on both composition and α; these parameters influence the photovoltaic field, which plays a large role in coupling efficiencies. Experimental results are compared with a mathematical model using a focused geometry, and values for the photovoltaic fields as a function of composition are extracted.

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