Estimation of third-order nonlinear optical susceptibility $\chi^{(3)}$ of synthetic Cu$_2$O crystal\(^1\) SHAHIN MANI, JOON JANG, JOHN KETTERSON, Department of Physics & Astronomy, Northwestern University, KETTERSON’S TEAM — High-quality crystals of Cu$_2$O were prepared by an improved method for thermally oxidizing metallic copper. We report the nonlinear refractive index ($n_2$) and the nonlinear two-photon absorption coefficient ($\beta$) of the resultant crystals. The following techniques were utilized: i) Z-scan, ii) third-harmonic generation, and iii) intensity-dependent interferometry. The third-order susceptibility ($\chi^{(3)}$) of a material plays important role in optical signal processing including switching, altering the frequency and the transmission characteristics. A comparison between the third-order nonlinear susceptibilities of a standard nonlinear reference material, carbon disulfide (CS$_2$) and Cu$_2$O will be made.

\(^1\)Supported by the National Science Foundation under grant CCF 03-29957.