We report the results of ultraviolet photolysis of γ-butyrolactone and γ-butyrolactone-$d_6$ trapped in solid nitrogen and argon. The infrared spectra obtained prior to photolysis are in agreement with the gas and liquid phase results obtained by Durig and coworkers\textsuperscript{a} and McDermott\textsuperscript{b}. The carbonyl stretching mode, observed at 1770 cm$^{-1}$ in the liquid, appears as a doublet at 1803 and 1775 cm$^{-1}$ (1797 and 1788 cm$^{-1}$ for the deuterated isotopomer) in the matrix.

The photoproducts were characterized via infrared spectroscopy. Irradiation at wavelengths below 250 nm results in the production of CO and CO$_2$. There is also evidence of a secondary photolysis which produces atomic oxygen. Possible mechanisms for the photolysis were evaluated, based on the observed photoproducts and \textit{ab initio} calculations. These results will be compared with those found for the thermal decomposition of this compound.

\textsuperscript{b}D. P. McDermott, J. Phys. Chem. 90, 2569 (1986).