

**MILLIMETER AND SUBMILLIMETER SPECTROSCOPY IN SUPPORT OF UPPER ATMOSPHERIC RESEARCH: RECENT RESULTS ON THE SPECTRA AND MOLECULAR PROPERTIES OF SIMPLE HALOGEN OXIDES AND OXOACIDS.**

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One of the main functions of the millimeter and submillimeter spectroscopy effort at the Jet Propulsion Laboratory has been to provide the necessary data base for the interpretation of satellite observations of the earth's upper atmosphere. In recent years the question of how structure influences reactivity led to our investigation of ClO dimer, a major reactant in polar ozone depletion. That study resulted in the determination of a peroxide structure, ClOOCl, as the Cl<sub>2</sub>O<sub>2</sub> species most likely to form in the atmosphere. **Since then we have gone on to analyze the spectra of Cl<sub>2</sub>O<sub>3</sub>, chlorine chlorate; HClO<sub>4</sub>, perchloric acid; BrOBr, dibromine monoxide; OBrO, bromine dioxide; and ClClO<sub>2</sub>, chloryl chloride. We have also extended earlier work on HOBr and BrO.**

**In this talk, we will briefly review the role of some of these molecules in the atmosphere, discuss their synthesis in our laboratory, and present some of the insights into their molecular properties which can be obtained from their rotational spectra.**