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This Week's Citation Classic

Inn E C Y & Tanaka Y. Absorption coefficient of ozone in the ultraviolet and visible regions. *J. Opt. Soc. Amer.* **43**:870-3, 1953.
[Air Force Cambridge Research Center, Air Research and Development Command, Cambridge, MA]

This paper presents results of a comprehensive set of absorption coefficient measurements of ozone in the spectral region 2000-7500A. Documentation of a consistent set of such data is relevant and important in studies of photochemistry of ozone in the stratosphere and in atmospheric pollution. [The *SCI*® indicates that this paper has been cited over 135 times since 1961.]

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"During the early 1950s I was associated with a group headed by Ken Watanabe at the Air Force Cambridge Research Center which was involved in laboratory atmospheric physics. The research program consisted of vacuum ultraviolet spectroscopy of atmospheric gases to generate molecular information required to understand their interaction with solar radiation. I believe this to be a pioneering effort which contributed in setting the stage for future atmospheric and space-related research.

"A major effort was devoted to absorption coefficient measurements of atmospheric gases. Realizing this study would involve tedious measurements, we decided to carry out the effort with continuous eight-hour shifts, day and night, for as long as required. Of course, this was bearable during the warm Boston days and nights only because the vacuum monochromator, dubbed 'Dumbo' (for Jumbo because Fred Marmo said it resembled an elephant), was housed in an air-conditioned room (a luxury during those years).

"After completing measurements on O_2, N_2O, CO_2, and H_2O, we then considered doing O_3. Meanwhile, Yoshio Tanaka joined our group, having spent the previous year with Robert Mulliken at the University of Chicago. His experience in handling ozone, which was quite hazardous, was an asset. We were successful in preparing pure ozone despite many low level detonations within the glass gas-handling system. We took precautions in surrounding the apparatus with protective plastic sheeting, manipulating stopcocks from behind this shield. The chemical reactivity of ozone was made evident by deterioration of the rubber tubing connection to the mechanical pump; the tubing walls became riddled with minute holes, the result of pumping out residual ozone during purification.

"After completing these vacuum ultraviolet measurements of ozone we decided to continue absorption studies in the near ultraviolet and visible spectral regions. The motivation was to bridge the gap in absorption spectra between the vacuum and near ultraviolet regions for this important atmospheric minor constituent Near the end of all our ozone studies we experienced a vivid reminder of ozone hazard. In a separate experiment, Yoshio had reached in through the plastic sheeting to manipulate a stopcock in the gas handling system. A loud explosion occurred with bits of glass flying all over. The plastic sheeting did an excellent job of protecting our bodies but his hand was hit by several bits of glass. Some of them were imbedded in his skin. Fortunately, the injury was not serious but the event left us with a deeper sense of caution in working with pure ozone.

"I was surprised that our paper was identified as one of the most cited in our field. I would imagine that reliability of the data may account for its frequent citation. We took all precautions to get the best precision and accuracy in our measurements. Good agreement with later measurements bears this out.[1] We had numerous requests for tabulated data shortly after this paper was published This led to a later publication with the values listed by wavelengths.-' It is interesting to note how our work is relevant to the recent interest in stratospheric ozone and atmospheric pollution."

1. **Griggs M.** Absorption coefficients of ozone in the ultraviolet and visible regions. *J. Chem. Phys*. **49**:857-9, 1968.
2. **Inn E C Y & Tanaka Y.** Ozone absorption coefficients in the visible and ultraviolet regions. *Adv. Chem*. **21**:263-8, 1959.