



Studies of the action of molecular singlet oxygen on proteins and amino acids
by James Ross Fischer

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF
PHILOSOPHY in Chemistry
Montana State University
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Abstract:

The effects of chemically and/or microwave discharge generated singlet oxygen on proteins and their constituents were shown to parallel the effects of dye sensitized photooxidation. This supports the contention that dye sensitized photooxidation is mediated by singlet oxygen. Chromatographic comparison of the products of oxidation by microwave generated singlet oxygen and dye sensitized photooxidation of amino acids known to be susceptible to dye sensitized photooxidation was made which showed the products to be identical. The photooxidation of lysozyme sensitized by hematoporphyrin was shown by application of tests involving deuterium oxide enhancement and azide inhibition to be mediated mainly by singlet oxygen. Studies of the effect of gas phase singlet oxygen on solid phase lysozyme and ribonuclease were used to further clarify the mechanisms of dye sensitized photooxidation and the effect of a potential pollutant on protein structures.

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OXYGEN ON PROTEINS AND AMINO ACIDS

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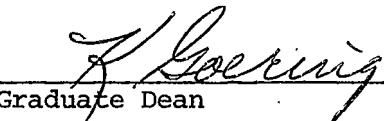
in

Chemistry

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MONTANA STATE UNIVERSITY
Bozeman, Montana

September, 1974

ACKNOWLEDGMENTS

I would like to express my gratitude to Dr. Samuel Rogers for his patience, guidance and assistance during the course of this research project. I would also like to thank the following people: Dr. Gordon Julian for guidance and encouragement, Dr. Kenneth Hapner for training and assistance in the operation of the amino acid analyzer, Dr. Ray Woodruff for guidance in the use of radiofrequency discharges, and Dr. Paul Jennings for assistance with mass spectra and their interpretation. The editorial efforts of members of my thesis committee, Drs. Arnold Craig and John Robbins, are gratefully acknowledged.

The encouragement and support of my wife, Lee Ann, are also gratefully acknowledged. I would like to dedicate this thesis to her.

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