

**A TREATISE OF  
ELECTRO-  
CHEMISTRY. OZONE**

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A treatise of Electro-Chemistry. Ozone by E. K. Rideal

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**E. K. RIDEAL**

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*A TREATISE OF ELECTRO-CHEMISTRY.*

EDITED by BERTRAM BLOUNT, F.I.C., &C.

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O Z O N E

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# O Z O N E

BY

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UNIV. OF  
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## EDITOR'S PREFACE.

THE idea of a series of books on Electro-Chemistry emanated not from me, but from Messrs. Constable. Some years back I wrote for them a book called "Practical Electro-Chemistry," intended to cover a great part of the ground of knowledge then extant. Fortunately, knowledge has a habit of growing and of propagating its kind, and my book, in consequence of this, became a "back number".

The subject of Electro-Chemistry is so ramified and specialised that it was impossible for one man to make a survey of the whole field. This fact is the genesis of the present series in which those who have accurate and intimate knowledge of the various branches of electro-chemistry have undertaken the work for which they are particularly qualified. It will be readily understood that, as the series of books was started at an early period of the war, many contributors were engaged in work of national and primary importance, and were unable, however willing, to apply themselves at the moment to exacting literary work. But this difficulty was gradually overcome, as some prospect of a period to the struggle came within view, with the result which the reader will judge with consideration for the onerous conditions under which my contributors have wrought.

The monographs resulting from their labours speak for themselves, and if the educational advantages which I have obtained from reading them during their passage through the press is shared by the public, I believe that the thorough and modern work of my friends and collaborators will be appreciated, and such faults as there be will be attributed to the person ultimately responsible—the Editor.

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## AUTHOR'S PREFACE.

EVER since the time of its discovery Ozone has attracted the attention of chemists, physicists, and industrialists alike. To the former it presented the first example of a gaseous allotrope of an element, differing from oxygen in many remarkable ways. The physicist frequently came in contact with the substance in his investigations on the conduction of electricity through air, whilst the industrialist was not slow to avail himself of an oxidising agent, unsurpassed in strength, leaving no objectionable material in its wake, and at the same time easy, if indeed somewhat expensive, to manufacture.

The angle from which Ozone and its modes of preparation was regarded by these three different sets of investigators naturally varied, and an endeavour has been made in the following pages to summarise and correlate the many different references which are to be found scattered over a wide field of literature. The merest survey, however, was sufficient to indicate that our knowledge of Ozone, its properties and modes of formation, is exceedingly scanty. The industrialist is ever at hand with extravagant claims as to the utility of "electrified oxygen"; the evidence as to the chemical behaviour and properties of ozone is somewhat meagre and frequently conflicting, for example, the existence of the ozonates and of oxozone still awaits confirmation; whilst the hypotheses advanced to explain the mechanism of its formation, either chemical, thermal, electrolytic, or photo-chemical, are purely speculative. Ozone is generally produced by means of the silent electric discharge, the

Aladdin's lamp of synthetic chemistry, for which no satisfactory "modus operandi" has been suggested, synthesis appearing to result from a combination of photo-chemical action and electron emission.

A study of the ultra-violet spectrum of oxygen and its allotropes gives us an insight into the various photo-chemical actions involved, and quantitative relationships may be obtained by an application of the quantum theory; at the same time the study of the disintegration or synthesis of the molecules by electron emission is as yet in its infancy.

The work of Sir J. J. Thomson at the Cavendish Laboratory on the subject of thermionics has opened up a new vista of electro-chemical research, for it would appear that the elements, including oxygen, can exist not only in the form of allotropes, but also as allotropic modifications possessing electrical charges. It remains for the future to reveal the influence of these charges on chemical reactivity.

Thanks are due to those who have been kind enough to place material dealing with the applications of ozone at my disposal, and if the following pages can assist in stimulating research both scientific and technical in this, one of the most interesting branches of electro-chemistry, the object of the writer will be fully attained.

ERIC K. RIDEAL.

UNIVERSITY OF ILLINOIS,  
ILLINOIS, U.S.A., 14th November, 1919.

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