CAMBRIDGE MONOGRAPHS ON PHYSICS

THE ADSORPTION OF GASES ON SOLIDS

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BY

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A sequel to the Cambridge Physical Tract written in 1939 *by J. K. Roberts and entitled* Some Problems in Adsorption

CAMBRIDGE
AT THE UNIVERSITY PRESS
1949

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9781107621428

First published 1949
First paperback edition 2013

A catalogue record for this publication is available from the British Library

ISBN 978-1-107-62142-8 Paperback

GENERAL PREFACE

The Cambridge Physical Tracts, out of which this series of Monographs has developed, were planned and originally published in a period when book production was a fairly rapid process. Unfortunately, that is no longer so, and to meet the new situation a change of title and a slight change of emphasis have been decided on. The major aim of the series will still be the presentation of the results of recent research, but individual volumes will be somewhat more substantial, and more comprehensive in scope, than were the volumes of the older series. This will be true, in many cases, of new editions of the Tracts, as these are republished in the expanded series, and it will be true in most cases of the Monographs which have been written since the War or are still to be written.

The aim will be that the series as a whole shall remain representative of the entire field of pure physics, but it will occasion no surprise if, during the next few years, the subject of nuclear physics claims a large share of attention. Only in this way can justice be done to the enormous advances in this field of research over the War years.

N. F.
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CONTENTS

CHAPTER 6

Some Other Types of Adsorption

CHAPTER 7

Dipole Interactions between Adsorbed Particles

AUTHOR'S PREFACE

Kinetic theory calculations can be carried out exactly when the dimensions of the apparatus used are small compared with the free path of the molecules in the gas. The discrepancies between such calculations and experiments on the exchange of energy between a metal surface and a gas at a different temperature suggested that the metal surfaces which had been used were all covered with adsorbed layers of impurity. To obtain results which would refer to known systems, it was necessary to work with surfaces kept free from impurities. This formed the starting-point for the experiments initiated by the late J. K. Roberts in 1931. These experiments, together with the theory so far as it had been developed by the end of 1938, were described in a Cambridge Physical Tract entitled *Some Problems in Adsorption*. The series of physical tracts were designed to provide interim reports of research work in progress, and it was intended that they should be replaced, as the development of their subject-matter demanded, by revised editions which would contain accounts of subsequent research. The present monograph is such a revision of Roberts's tract on adsorption. When the original tract was written statistical theories had not been developed to describe either the behaviour of immobile films (which had been studied by empirical methods) or of the effect of dipole-dipole, in addition to van der Waals, interactions; nor had account been taken of the continuous variation of the potential field provided by the adsorbing surface. In considering a revision of the original tract it seemed desirable to rewrite it so that these matters could be dealt with adequately. To do this it was necessary to discard much of the original text and to rearrange the presentation of the remainder to conform to the new material which was to be introduced. In the result, about half of the present book consists of new material, which is contained mainly in Chapters 2, 3 and 7, with important additions also to Chapters 4 and 5.

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21 MAY 1947