reich und in sehr ansprechender Weise verwirklicht.

Inhaltlich gliedert sich das Buch in zwei Teile. Der erste bringt die wesentlichen theoretischen Grundlagen der Kristallisation unter Berücksichtigung von Phasen-, Stoff- und thermischen Gleichgewichten, der Kristallisationskinetik und ferner der Eigenshaften der Kristallisationsprodukte. Der zweite Teil ist der Berechnung von Kristallisationsanlagen gewidmet. Dabei interessieren hier die konstruktiven Details einzelner Apparaturen weniger als allgemeine methodische Grundsätze der Klassifizierung von Kristallisatoren insbesondere vom Standpunkt der Bewegung und Übersättigung des Lösungsmittels, des Durchsatzes und der Kristallbeschaffenheit aus. Die wichtigsten Kristallisatortypen werden unter diesen Aspekten näher betrachtet. Ein Anhang mit Kristallisationsdaten für eine Reihe herkömmlicher Verbindungen, einer Löslichkeitstabelle und einem Symbolverzeichnis ergänzt schliesslich die beiden Hauptteile. Hervorgehoben zu werden verdienen ausserdem die umfangreichen Literaturhinweise am Ende jedes einzelnen Kapitels.

Dieses ausgezeichnete auf alle Weitschweifigkeiten verzichtende Buch vermittelt dem Verfahrensingenieur der chemischen Industrie und darüber hinaus jedermann, der sich mit Kristallisationsprozessen beschäftigt, nützliche Informationen über Auswahl und Gestaltung technischer Kristallisationsanlagen. Ihm ist eine weite Verbreitung im Kreise der Fachleute zu wünschen.

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Quench hardening in metals.

By H. KIMURA and R. MADDIN. Pp. 124. Amsterdam: North Holland, 1971. Price *f* 36.00 (*ca.* $11.25.)

This book, the third volume in the series on defects in crystalline solids under the general editorship of Amelinckx, Gevers & Nihoul, is concerned chiefly with the mechanism of quench hardening in the pure f.c.c. metals, in particular aluminum and gold. The first part of the book provides an introduction to the properties of point defects in thermal equilibrium, and discuss the possibliity of quenching in vacancies. Experimental results on various mechanical properties which are affected by quenching are then reviewed, together with some electron-microscope investigations into the nature of the defects in quenched metals. Interactions of dislocations with these defects and with dispersed vacancies are considered, and recent experiments revealing the operation of such interactions in aluminum and in gold are examined in order to explain the mechanism of quench hardening in these metals. The book is a good short review of our present understanding of quench hardening, and full references to the relevant literature are given.

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Surface self-diffusion of metals.

By G. NEUMANN and G. M. NEUMANN, Pp. 129. Diffusion Monograph Series, Diffusion Information Centre, Switzerland, 1972. Price (Paperback) $15.00, (subscription rate per year, 4-6 monographs $42.)

In the last decade or so there have been many developments in the field of surface self-diffusion of metals. Review articles have been scattered in the Journals or in Conference Proceedings and have emphasized particular aspects of the phenomenon. A monograph devoted exclusively to the subject, and reviewing it as a whole, is therefore to be welcomed.

In form this monograph consists of four sections which deal with experimental techniques, results, theoretical models and the compatibility of models and measurements.

In the first section the techniques which have been used to determine surface diffusivity are described and their application critically discussed. Many of them depend directly on the measurement of shape changes promoted by free-energy minimization and this writer feels that the discussion of the surface thermodynamics which is their basis could usefully have been larger. However this is a minor criticism for the discussion given is very adequately referenced, as indeed is the whole volume.

There is a large amount of experimental data on surface self-diffusion representing the investigation of numerous metals over wide ranges of temperature by various techniques. Arrhenius plots yield activation energies and frequency factors which specify a diffusion coefficient. The authors present the data in a useful and attractive tabular form which allows easy reference to the results and conditions of any particular investigation and also facilitates comparisons. It is here that the problems of the subject become clearly apparent, for the variations in the data indicate the important role of surface structure, impurity adsorption, technique and temperature range in determining the measured diffusivity. The solutions to these problems may only be sought through consideration of atomic migration processes in detail and the third section of the book presents a lucid account of the Kossel–Stranski model of the metallic surface and the Terrace–Ledge–Kink model of surface diffusion which has developed from it.

In the final section the extent to which it has been possible to rationalize the data in terms of reduced parameters and identify particular mechanisms is considered, and conclusions drawn about the relative value of the various techniques in what remains an open field. One wonders if the powerful technique of Auger electron spectroscopy, which in principle enables on to follow the migration of 'foreign' adatoms on a 'host' surface might be made to yield useful data in a similar way to that in which the study of certain dilute alloys has yielded useful information about host metals.

To summarize, there is a good deal of information in this volume, and one imagines that it will be useful to both the specialist in the field and to the reader with metallurgical interests in the general area of diffusion who wishes to know the current state of knowledge in this particular part of it. In this connexion it is worth mentioning that this is one of a number of monographs which will be forthcoming from the publisher this year on various transport processes and details are obtainable from them of a 'bulk-buy' which would secure the series at an appreciable saving over the cost of individual copies.

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