general readers who are interested in applications of X-ray diffraction, especially, for example, to mineralogy rather than to metals or semiconductors, it may be helpful.

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Growth and properties of metal clusters: applications to catalysis and the photographic process. Edited by J. BOURDON. Pp. xviii + 549. Amsterdam, Oxford, New York: Elsevier, 1980. Price US $97.50, Dfl 200.00.

A conference with this title was held at Villeurbanne, France, in September 1979 in order to bring together research workers in various academic disciplines and from the different industries whose technology depends on the growth and properties of metal clusters. The book contains most of the papers presented at the conference, together with a record of the discussion after each paper and a more general panel discussion. The different papers are grouped under the titles: *Nucleation, growth, coalescence*; *Electrocrystallisation*; *Structures, physico-chemical properties, theory*; *Application to the photographic process*; *Structure and catalytic reactivity*; *Application to catalysis*.

The conference came at an appropriate time for photographic scientists since, at the previous year's International Congress held at Rochester, New York, thermodynamic theories of the formation of latent images had been established as alternatives to earlier atomistic theories. Moisar and Malinowski, the two leading exponents of this thermodynamic formalism, summarize their ideas in separate papers, that of Moisar extending the approach for the first time to consider photographic fog. Other interesting papers in the photographic section include those of Hamilton, which summarizes work on vacuum-deposited silver and gold nuclei and its relevance to latent-image theory, and Hoffman, who proposes that developability depends on the thermodynamic state of the silver halide microcrystal rather than on the size of the silver cluster (latent image).

One aspect of Malinowski's description of latent-image formation is the idea of a rapid diffusion of silver atoms on the silver halide surface. The growth and diffusion of metal clusters on substrate surfaces is described for two very different systems by Ehrlich & Stolt – rhenium on tungsten – and Wynblatt – platinum on alumina.

Other examples of physical phenomena being encountered in widely different fields are seen in the papers on electrocrystallization by Maurin & Budewski, Staikov and Bostanov. The formation of nuclei under high overpotential (high supersaturation) and their growth at an overpotential just below the critical, the tendency to form increasing numbers of twins at higher overpotential and the rapid growth of multiple twins are all familiar to those who have studied the growth from solution of inorganic crystals, including photographic silver halide emulsions.

A question which is touched upon in several different papers and examined in the panel discussion is the size at which a cluster ceases to be a cluster and adopts the properties of the bulk metal. There was general agreement that the transition size will depend on the property being measured, and the calculations of Hamilton and co-workers and Cyrot-Lackmann and the measurements by Kreibig on gold clusters in photosensitive glass all support a transition from 'cluster state' to bulk structure at a size of several hundred atoms.

The conference was a success in that it led to fruitful contact between scientists in many disciplines. In particular, papers were presented by Salem and by Cyrot-Lackmann which described two very different approaches to calculating metal-cluster–adsorbed-molecule structures, which provoked much stimulating discussion. The absence of Salem's paper in the book is a serious omission from an otherwise admirable recapture of the conference.

The book will be useful to specialists in the different fields who wish to obtain an appreciation of current work in the other fields. The paper by Moisar & Granzer may be particularly useful as an introduction to the photographic process for the non-specialist.

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Defects and diffusion in solids: an introduction. By S. MROWEC. Pp. 466. Amsterdam, Oxford, New York: Elsevier, and Warsaw: Polish Scientific Publishers, 1980. Price US$83.00, Dfl 170.00.

This is the fifth volume of a series in *Materials Science Monographs*. Professor Mrowec, a specialist in the study of defects and diffusion in solids, has made many contributions in the study of metals and their oxides and sulphides. The book is an excellent introduction to material science; it is divided into four chapters with strong emphasis on experimental aspects.

The first chapter describes briefly the most common structures of solids and their linear and planar defects. Thermodynamically reversible defects are extensively treated with an elegant discussion of point defects and their thermodynamic properties. In the section on extended defects, not included in the Polish edition, the author gives a fairly complete discussion on complexes and defect clusters. The first chapter ends with a small section on the electrical conductivity of ionic crystals that is too short to help the reader and is the weak point of the book.

The second chapter, *Diffusion in the solid state*, after a short introduction to Fick's laws, describes the basic mechanisms of lattice diffusion and the correlation effect. A short discussion on the relation between diffusion and ionic