

2030!), 45 have now appeared, including Volume 31 which is reviewed here, and which collects together Marx's writings on the natural sciences, mainly on chemistry.

The "chemical manuscripts" compilation is neither an essay on chemistry nor a textbook on the subject. Instead it is a collection of extracts from the works of many chemists and authors of textbooks who greatly influenced the development of the subject in the second half of the 19th century. These include Lothar Meyer, Henry Roscoe, and Carl Schorlemmer (described as "the first chemist who was a socialist, and the first socialist who was also a chemist"). But one cannot evaluate this book as a collection of key concepts and a summary of the chemistry of the period, one can only recognize its existence and marvel at the untiring diligence of Marx in putting together these notes, which touch on a wide range of topics including metals, acids and bases, many inorganic substances, hydrocarbons, carboxylic acids, amines, carbonyl compounds, carbohydrates, fats, etc.

Why did Marx write down this great collection of facts, which must probably be regarded as an aid to his own learning process, and why did he devote so much effort to the task? We do not know, since he did not incorporate these studies into his later writings. What was the source of the fascination that the natural sciences, especially chemistry, held for him? Firstly, Marx emphasized repeatedly that philosophy was inconceivable without taking into account the contribution of the exact sciences. He was especially impressed by the factual nature of chemistry and by its freedom from metaphysical ideas. Furthermore, that science in particular provided many examples of quantities being transformed into (new) qualities, which is well known to be one of the central ideas in Marx's work. And lastly Marx, as a very keen observer of changes in society, saw the rapidly changing subject of chemical science and the spectacular growth of industrial chemistry as a sort of enormous political and economic laboratory in which important processes were occurring, in particular the development of methods of production not seen before.

Now, when the political implementation of Marx's ideas has been aban-

doned, it is increasingly recognized that he was one of the world's great polymaths, for whom there was no conflict between the natural sciences and the humanities. Glancing through the pages and chapters of this book, one cannot avoid wondering whether present-day philosophers have such a profound knowledge of aspects of chemistry as Marx had, or whether they would be willing to take the trouble to acquire it. The conversion of materials into new forms is just as important for society now as it was then, and if anything it has become more so. But despite that, present-day authors are not accorded the same degree of credit for their achievements, as is evident, for example, in the comments of Sloterdijk on genetic engineering and molecular biology.

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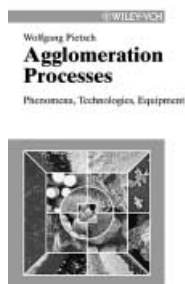
Agglomeration Processes. Phenomena, Technologies, Equipment. By Wolfgang Pietsch. Wiley-VCH, Weinheim 2002. 614 pp., hardcover € 259.00.—ISBN 3-527-30369-3

Agglomeration is such a widespread and frequently used phenomenon that we are often not consciously aware of it, for example, in its roles in wet sand, concrete, bread, coal briquettes, medications in the form of pressed tablets, moldings in the "green" state (namely, before heat treatment to form ceramics), muesli bars, etc. The aim of this book is to provide a comprehensive and up-to-date survey of industrial agglomeration techniques and their applications.

The author begins with an introduction to the properties of agglomerates and the special features of different technologies, then describes various types of equipment for agglomeration and their special characteristics. The

main emphasis is on industrial applications rather than on the underlying science. The topics covered include the fundamental principles of agglomeration, agglomeration by roll-forming, by deposition, by compression, and by melting and sintering processes, the design of equipment, process development, and the planning of plant layouts. The processes and equipment are described in thorough detail, with many diagrams and photographs, and the lists of equipment manufacturers are an especially impressive and useful feature. The 340 entries are clearly arranged under appropriate headings, and include full addresses with telephone and fax numbers. Firms who will manufacture equipment to order are also listed, which is a useful addition. Anyone engaged in practical work involving agglomeration will find this a uniquely valuable reference source on equipment.

On the other hand, the scientist interested in the subject will find nothing that is new or instructive in the theoretical part, especially as the examples do not provide enough background information or literature references. In this connection it is disturbing to find that many of the figures, which have evidently been taken from the original publications, are not accompanied by enough detailed information. Sometimes there is no explanation of terms appearing in a figure, so that a reader with little previous knowledge will fail to understand the point, as, for example, in Figure 5.21 relating to the Hamaker constant which is involved in the attractive force between small particles. As another example, Figure 5.53 is intended to show typical length scales for certain systems, but the associated comments are unclear and contain information that is simply wrong: mechanical processes are not capable of reducing particles to sub-nanometer dimensions, nor do macromolecules with dimensions less than 0.1 nm exist, and the radii of atoms are in the order of femtometers. A beginner in the field of agglomeration, especially if he or she does not have a basic knowledge of mechanical processing methods (e.g., from *Mechanische Verfahrenstechnik* by H. Rumpf), will have great difficulties in trying to understand this bulky work. To gain a deeper understanding of the theory of particle-par-



ticle interactions it would be advisable to read, in parallel with this book, a standard work on colloid science such as R. J. Hunter's *Introduction to Modern Colloid Science*.

Some parts of the book lack a systematic structure, which does not make for easy reading. Some aspects are repeated without adding usefully to the information content. Several modern developments, such as fractals or sol–gel processes, are mentioned without explaining their detailed meaning to the nonspecialist. Also with regard to applications, the reader is sometimes left with descriptions that are too unspecific and are therefore unhelpful. One example occurs in discussing the agglomeration of certain systems through the use of adsorbing polymers, which are usually

electrically charged. Although the principle is explained briefly, the reader is not told (apart from giving some meager literature references) which polymers can be used to produce a particular agglomeration effect. A second example is in the discussion of milling agents which can be used to reduce caking effects. Unfortunately one cannot find information anywhere in the book about how to choose such additives for specific applications. It is understandable that in such cases the author, who has for many years acted as a consultant in the area of agglomeration technology, cannot give much detailed information about his clients' particular systems. Here it would have been useful to give instead some detailed descriptions of relevant scientific work with references, although it

must be admitted that it might have resulted in a longer book than intended. Nevertheless, in view of the amount of material covered in the book, the total of 111 literature references (when compared with 160 of the author's own publications that are also cited separately in full detail) seems a disappointingly small number.

To summarize, there is no doubt that the book is a worthwhile purchase for anyone who is concerned in a practical way with equipment for agglomeration processes. However, it fulfills the role of a work of reference rather than of a textbook or treatise.

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