

information on individual compounds through the computer searches which are now available.

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*Gmelin–Durrer Metallurgy of Iron, Vol. 12, Future of Iron- and Steelmaking*

Edited by P Nilles (Centre de Recherches Metallurgiques, Liège, Belgium), Springer, Berlin, 1991, Vol. 12a xxii + 270 pages, Text, Vol 12b xviii + 262 pages, Illustrations, English and German Subject Index. Not available separately. DM3038. ISBN 3-540-93644-0

We have come to regard the Gmelin Handbook of Inorganic and Organometallic Chemistry as a superbly organised archive where the past development of the subject is painstakingly and comprehensively documented. It comes as something of a shock therefore to find a pair of volumes, part of System No. 59 Iron, entitled ‘The Future of Iron- and Steelmaking’. This completes the fourth edition of the Gmelin–Durrer Metallurgy of Iron, brings together the subjects of the previous volumes, takes stock of present trends in iron- and steelmaking and boldly projects these as far as the next millenium.

The introduction explains that in 1928 the Gmelin Institute approached Robert Durrer to edit the volumes on the Metallurgy of Iron. Since there was at that time no comprehensive text available it was agreed that the Gmelin volumes should be much broader in scope than those of most other elements and that an attempt should be made to integrate fundamental science and basic chemistry on the one hand with industrial practice on the other. The first three editions were published in 1930–33, 1942 and 1943: the twelve-volume fourth edition has appeared over the period 1964–1992. Inevitably with such a long-running project there have been several principal editors. In this final volume Paul Nilles of the Centre de Recherches Metallurgiques in Liège and Walter Lippert of the Gmelin Institute have commissioned authors from the International Iron and Steel Institute in Brussels, the Verein Eisenhüttenleute in Düsseldorf and a team from industry – mainly Voest Alpine Stahl in Linz and Thyssen Stahl AG in Duisberg. The result is a fascinating up-to-date account of the industry as a whole: after looking at the trees in the earlier volumes, we now view the wood. It is customary in the financial pages of the newspapers to denigrate the “rustbelt” iron and steel industry, but with a world

production of between 700 and 800 million tonnes per year, slowly shifting from “industrialised” to “developing” countries, the industry represents an enormous capital and human investment and has widespread economic and environmental impact. The subjects discussed in Volume 12a (the accompanying diagrams appear separately in Volume 12b) reflect present day concerns and are of interest far beyond chemistry and metallurgy. They include: steel and the economy, energy input and resources, environmental control – state of the art and future demands, air protection, the Greenhouse Effect, dioxin formation, waste disposal, technological development (with 170 pages much the largest section providing a summary and critical assessment of the processes discussed in previous volumes), quality criteria and control, education and professional qualifications.

These valuable books will be prohibitively expensive for most libraries: at more than DM3000 only the most affluent institutions will be able to afford them. This is particularly sad since all who work in or with the iron and steel industry – managers, technologists, researchers, teachers, students, economists and journalists – will find them stimulating, authoritative, and also full of interesting information and new insights.

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*Gmelin–Durrer Metallurgy of Iron, Vol. 10, Practice of Steelmaking 4, Ingots, Castings, Powder Metallurgy*

Edited by H. Hiebler (Institut für Eisenhüttenkunde, Montanuniversität Leoben, Austria), Springer, Berlin, 1991, Vol. 10a xvi + 209 pages, text, Vol. 10b, xi + 182 pages, Illustrations, English and German Subject Index. Not available separately. DM2247. ISBN 3-540-93643-2

The twelve volumes of Gmelin–Durrer ‘Metallurgy of Iron’ published between 1964 and 1992 are incorporated into the eighth edition of the Gmelin Handbook of Inorganic and Organometallic Chemistry as part of System No 59 ‘Iron’. They constitute a monumental account of a subject which despite its roots in antiquity continues to develop through the application of new scientific research to long established industrial practices.

Volumes 10a and 10b review the literature up to 1990 but a glance at the references at the end of each section shows that most come from the 1980’s - indicat-

ing the continuing vitality of research in the subjects covered. As in other volumes of Gmelin–Durrer the text and references are in one volume and the diagrams and index are in the other. This may make for ease of production but the reader requires a large working space to accommodate two open volumes as well as something to write on. The editor is H. Hiebler who has enlisted as authors both colleagues in university institutes (from his own in Leoben and from Vienna and Darmstadt) and contributors from industry (Voest-Alpine Stahl Linz GmbH, Thyssen Edelstahlwerke A-G Witten, Radex Austria A-G and Vanel Systeme GmbH). This combination of academic and industrial expertise gives Gmelin–Durrer its unique authority and means that its volumes can be read with profit and enjoyment by a wide range of readers.

The first part of the book (69 pages) deals with ingot mould materials and construction, ingot casting of steel both killed, *i.e.* treated to remove traces of oxide, and rimmed or semi-killed where the activity of oxygen is sufficient to result in reaction with carbon during the solidification process. In spite of the move towards continuous casting in large scale steel production ingot

casting is likely to persist in the foreseeable future for special grades or special rolling or forging shapes. There is then a section on mould casting (56 pages), *i.e.* where the molten steel is poured into a mould which is close to the final shape with the inner cavities formed by insertion of refractory sand cores. This contains much technical information on the preparation and composition of both high and low alloy steels. The final section (78 pages) on powder metallurgy of steel covers powder manufacture, cold pouring, hot consolidation, sintering and a comprehensive survey of materials and applications. Discussion of fundamental densification processes is combined with much fascinating detail on design to ensure that the manufacture of various shapes is practicable.

As always with Gmelin the production and presentation are impeccable.

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