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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
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Letter
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SOURCES OF INFORMATION ON THE PROPERTIES OF METALS AND ALLOYS (BOOKS)

The National Bureau of Standards receives frequent requests for general information on the properties of metals and alloys, which are often so comprehensive in scope that reference to sources of information is the only reply practicable. This Letter Circular has been prepared for that purpose. The list of references is by no means complete. The attempt has been made to give only a working bibliography. Many references, particularly foreign ones, have been intentionally excluded from the list together with books intended for specialists' use. Articles appearing in technical periodicals have not been listed except for several series of special metallurgical lectures, symposia, and general discussions. The indexes and abstracts listed in this Letter Circular will be helpful in locating articles on special subjects in the technical literature. The National Bureau of Standards has prepared a number of information circulars dealing with individual metals and alloys. These are included in the lists of references. Information on mechanical properties of specific alloys and metals is often included in specifications for such materials.

The various sources contained herein have been arranged topically, the reference books and periodicals are generally available in any large technical or scientific library. Addresses of publishers of most of the books are listed on page 21, only the name being given after that of the book, except in the case of unusual or less common addresses, which are given together with the title of the book.

Letter Circular 522 of the National Bureau of Standards lists all the metallurgical publications which have originated in work carried out at the Bureau. A copy of that Letter Circular will be sent on request.

The Bureau of Mines, Department of the Interior, Washington, D. C. has issued a considerable number of pamphlets on the occurrence, refining, and properties of metals and other materials. A list of these publications will be sent on application to the Bureau of Mines and copies of the papers themselves may be consulted at Government depository libraries in the larger cities.

Contents

A. Lists of alloys

Ref.

A 1 Engineering alloys. N. E. Woldman and A. J. Dornblatt. Am. Soc. Metals (1936).

2 A list of alloys. W. Campbell. Proc. Am. Soc. Testing Materials 22 (1) (1930).

3 1001 alloy formulas. E. C. Jarvis. Niagara Falls Smelting and Refining Company, Buffalo, N. Y. (1927).

4 Tous les alliages (All the alloys). A. Chaplet. G. Villars, Paris (1925).

B. Abstracts and indexes

Ref.

B 1 Chemical Abstracts (monthly). Am. Chem. Soc., Mills Building, Washington, D. C.

2 Metals and Alloys: Current metallurgical abstracts (monthly). Cumulative index, 1929-1931; 1932-1934; 1935; 1936; 1937.

3 Industrial Arts Index. H. W. Wilson Company, New York, N. Y.

4 Engineering Index. Am. Soc. Mech. Engrs.

5 Journal of Chemical Society. Gurney and Jackson, 33 Paternoster Row, London, E. C. 4, England.

6 Science Abstracts. Spon and Chamberlain.

7 Physikalische Berichte (Journal of Physics). F. Vieweg & Sons.

8 Journal of Institute of Metals. Metallurgical abstracts (monthly). London, England.

9 Journal, Iron and Steel Institute. Notes on progress of iron and steel industry (semi-annual). London, England.

C. Handbooks

Ref.

C 1 Welding Handbook. 1st edn. American Welding Society, 29 West 39th Street, New York, N. Y. (1938).

2 Kurzgefasstes Handbuch aller Legierungen (Concise Handbook of All Alloys). E. Jänecke. Otto Spamer. Verlag, Leipzig (1937).

3 Metals Handbook. Am. Soc. Metals (1936).

4 Cast Metals Handbook. Am. Foundrymen's Assn. (1935).

5 Handbook of Chemistry and Physics (annual). Chemical Rubber Publishing Company (1935).

6 Iron and Steel, a pocket encyclopedia. H. P. Tiemann. 3rd edn. McGraw-Hill Book Co. (1933).

7 Smithsonian Physical Tables. The Smithsonian Institution. Washington, D. C. (1932).

8 Mechanical Engineers Handbook. L. S. Marks. McGraw-Hill Book Co. (1930).

9 Handbook of Nonferrous Metallurgy. D. M. Liddell (2 volumes). McGraw-Hill Book Co. (1926).

C. Handbooks (continued)

C 10 International Critical Tables (II. Metallurgical data). National Research Council. McGraw-Hill Book Co. (1926-28).
11 Mechanical Engineers Handbook. R. T. Kent. J. Wiley & Sons (1923).
12 Physikalische-Chemische Tabellen (Physical-chemistry tables). Landolt-Bornstein-Roth. J. Springer (1923).
13 The Goldsmith's Handbook; containing full instructions for the alloying and working of gold. G. E. Gee. Crosby Lockwood & Sons(1922).
14 Scientific American Cyclopedia of Formulas. A. E. Hopkins. Sci. Am. Pub. Co., New York, N. Y. (1921).
15 Chronology of Iron and Steel. S. L. Goodale. Pittsburgh Iron and Steel Foundries Co. (1920).
16 The Founder's Manual. David W. Payne. D. Van Nostrand Co. (1920).
17 Henley's Twentieth Century Book of Recipes, Formulas and Processes. N. Henley (1919).
18 Metal Worker's Handy Book of Receipts and Processes. W. T. Brannt. H. C. Baird & Co. (1919).
19 Metallurgical Calculations. J. W. Richards. McGraw-Hill Book Co. (1918).

D. Statistics

Ref.

D 1 Standard metal directory. 7th edn. Atlas Publishing Co., New York, N. Y. (1936).
2 Directory iron and steel works of the United States and Canada. Am. Iron and Steel Inst. (1935).
3 Metal statistics. Am. Metal Market Co., 11 Cliff St., New York, N. Y.
4 Mineral industry. McGraw-Hill Book Co. (annual).
5 Annual statistical report of the American Iron and Steel Institute. Am. Iron and Steel Inst.
6 American Bureau of Metal Statistics, 115 Broadway, New York, N. Y.

E. Nonferrous metals and alloys (general)

Ref.

E 1 Die Korrosion von nichteisenmetallen und deren Legierungen (The corrosion of nonferrous metals and their alloys). C. Kröhnke and G. Masing. Ed. H. S. Hirzel, Leipzig (1938).
2 Bearing metals and alloys. H. W. Bassett. Edw. Arnold & Co., London (1937).
3 Modern uses of nonferrous metals. Edited by C. H. Mathewson. Am. Inst. Min. Met. Engrs. (1935).
4 Precious metals. E. A. Smith. N.A.G. Press, London (1934).
5 The casting of brass ingots. R. Genders and G. L. Bailey. Brit. Nonferrous Metals Res. Assn., Euston St., London, N. W. 1. (1934).
6 The materials of aircraft construction. F. T. Hill. Sir I. Pitman & Sons (1933).

E. Nonferrous metals and alloys (general) (continued)

E 7 Bearing metals and bearings. W. M. Corse. Reinhold Pub. Co. (1930).
8 Impurities in metals. C. J. Smithells. 2nd edn. J. Wiley & Sons (1930).
9 Metallurgy of white metal scrap. E. F. Thews. D. Van Nostrand (1930).
10 The metallurgy of bronze. H. C. Dews. Sir I. Pitman & Sons (1930).
11 Tin solders. A modern study of the properties of tin solders and soldered joints. J. S. Nightingale. British Nonferrous Metals Res. Assn. (1929).
12 Alloys and their industrial applications. E. F. Law. 4th edn. C. Griffin & Co., London (1926).
13 Metallic alloys. G. H. Gulliver. 5th edn. C. Griffin & Co. (1926).
14 Science of metals. Z. Jeffries and R. S. Archer. McGraw-Hill Book Co. (1924).
15 Aeronautics, metallurgy, general index. R. Glazebrook. MacMillan & Co. Ltd., London (1923).
16 Chemistry of the rare metals. B. F. Hopkins. D. C. Heath & Co., Boston (1923).
17 Engineering nonferrous metals and alloys. L. Aitchison and W. R. Barclay. H. Frowde & Hodders & Stoughton, London (1923).
18 Metals and metallic compounds. U. R. Evans. 4 vols. E. Arnold & Co. London (1923).
19 Metals and their alloys. C. Vickers. H. C. Baird & Co. (1923).
20 A comprehensive treatise on inorganic and theoretical chemistry. J. W. Mellor. 16 vols. Longmans, Green & Co. (1922-37).
21 Gold alloys, their manufacture and application. G. F. Gee. Crosby Lockwood & Son, London (1922).
22 Metallography. 2. Metals and their common alloys. S. Hoyt. McGraw-Hill Book Co. (1920).
25 Brazing and soldering. J. F. Hobart. D. Van Nostrand (1919).
Also references: N[illegible], 2, 5, 6, 7, 9.

F. Iron and steel

Ref.

F 1 Molybdenum in steel. Climax Molybdenum Corp., 500 Fifth Avenue, New York, N. Y. (1938).
2 Nickel alloy steels, compilation of data sheets. The International Nickel Company, 67 Wall Street, New York, N. Y. (1938).
3 The outline of steel and iron. A. Allison. The Sherwood Press, Cleveland, Ohio (1937).
4 Tool steel simplified. F. R. Palmer. Carpenter Steel Co., Reading, Pa. (1937).
5 Vanadium steels and irons. Vanadium Corporation of America, 420 Lexington Avenue, New York, N. Y. (1937).
6 Production, heat treatment, and properties of iron alloys. L. Jordan. Circular, National Bureau of Standards C409. Superintendent of Documents (1936). 10 cents.
7 Steel physical properties atlas. Am. Soc. Metals (1936).

F. Iron and steel (continued)

F 8 Technical iron and steel. P. Oberhoffer (revised by W. Eilender and H. Esser). J. Springer (1936).
9 The alloys of iron and carbon. I. Constitution, S. Epstein. II. Properties, F. T. Sisco. McGraw-Hill Book Co. (1936).
10 Bibliography on non-metallic inclusions in iron and steel. L. F. McCombs and M. Schrere. Carnegie Institute of Technology (1935).
11 Book of stainless steels. E. E. Thum. 2nd edn. Am. Soc. Metals (1935).
12 Chromium steels. R. H. Greaves. His Majesty's Stationery Office, London (1935).
13 Constitution of steel and cast iron. F. T. Sisco. Am. Soc. Metals (1935).
14 Inclusions in iron. C. Wohrman. Am. Soc. Metals (1935).
15 Lectures on steel and its treatment. J. F. Keller. Am. Soc. Metals (1935).
16 Metallography and heat treatment of iron and steel. A. Sauveur. 4th edn. Cambridge Mass. University Press (1935).
17 Principles of phase diagrams. J. S. Marsh. McGraw-Hill Book Co.(1935).
18 Sonderstahlkunde (Special steels). E. Hondremont. J. Springer (1935).
19 Steel and its heat treatment. D. K. Bullens. J. Wiley & Sons (1935).
20 Steel treating practice. R. M. Sherry. McGraw-Hill Book Co. (1935).
21 The metal - iron. H. E. Cleaves and J. G. Thompson. McGraw-Hill Book Co. (1935).
22 The quenching of steels. H. J. French. Am. Soc. Metals (1935).
23 Tool steels. J. P. Gill. Am. Soc. Metals (1935).
24 Working, heat-treating and welding of steel. H. L. Campbell. J. Wiley & Sons (1935).
25 Metallurgy of iron and steel. B. Stoughton. McGraw-Hill Book Co.(1934).
26 The alloys of iron and copper. J. L. Gregg and B. N. Daniloff. McGraw-Hill Book Co. (1934).
27 The alloys of iron and tungsten. J. L. Gregg. McGraw-Hill Book Co. (1934).
28 The alloys of iron and silicon. E. S. Greiner, J. S. Marsh and Bradley Stoughton. McGraw-Hill Book Co. (1935).
29 The alloys of iron and molybdenum. J. L. Gregg. McGraw-Hill Book Co. (1932).
30 The physical chemistry of steel-making; the solubility of iron oxide in iron. C. H. Herty. Carnegie Inst. of Technology (1932).
31 Chemical analysis of iron and steel. G. E. F. Lundell, J. I. Hoffman and H. A. Bright. J. Wiley & Sons (1931).
32 High-speed steel. M. A. Grossman and E. C. Bain. J. Wiley & Sons (1931).
33 Non-metallic inclusions in iron and steel. Carl Benedicks and H. Lofquist. J. Wiley & Sons (1931).
34 Stainless iron and steel. J. H. G. Monypenny. 2nd edn. McGraw-Hill Book Co. (1931).
35 Elements of ferrous metallurgy. J. Rosenholtz. J. Wiley & Sons (1930).

F. Iron and steel (continued)

F 36 Sheet steel and tin plate. R. W. Shannon. Reinhold Pub. Co. (1930).
37 Photomicrographs of iron and steel. E. L. Reed. J.Wiley & Sons (1929).
38 An introduction to the metallurgy of iron and steel. H. M. Boylston. J. Wiley & Sons (1928).
39 Automobile steels. A. Mueller-Hauff and K. Stein. (translation). J. Wiley & Sons (1927).
40 Non-technical chats on iron and steel. L. W. Spring. F. A. Stokes Co. New York, N. Y. (1927).
41 Principles of metallurgy. An introduction to the metallurgy of metals. C. H. Fulton. Am. Soc. Metals (1927).
42 Das technische Eisen, Konstitution und Eigenschaften (Technical iron, constitution and properties). P. Oberhoffer. J. Springer (1925).
43 Metallurgy in aircraft construction. S. Daniels and F. T. Sisco. Air Service, Dayton, Ohio (1925).
44 Molybdenum, cerium and related alloy steels. H. W. Gillett and E. L. Mack. Reinhold Pub. Co. (1925).
45 The making, shaping and treating of steel. J. Camp and C. B. Francis. 4th edn. Carnegie Steel Co., Pittsburgh (1925).
46 The manufacture of electric steel. F. T. Sisco. McGraw-Hill Book Co. (1924).
47 Invar and related nickel steels. Circular, National Bureau of Standards C58. Superintendent of Documents (1923). 30 cents.
48 Metallurgy of steel. F. W. Harbord and J. W. Hall. J. B. Lippincott Co. (1923).
49 Aircraft steels and materials. L. Aitchison. Constable & Co., London (1922).
50 Engineering steels. L. Aitchison. D. Van Nostrand (1921).
51 Heat treatment of soft and medium steels. F. Giolitti. McGraw-Hill Book Co. (1921).
Also references: C6, C15, Nb1 - 15, Nd1 - 12, Ng10.

The names of steel manufacturers and the type of product they manufacture are listed in the Iron and Steel Works Directory of the United States and Canada, American Iron and Steel Institute, 350 Fifth Avenue, New York, N. Y. Useful pamphlets describing their products have been issued by many companies. The following are typical:-

American Rolling Mill Company, Middletown, Ohio
Bethlehem Steel Company, Bethlehem, Pennsylvania
Carnegie-Illinois Steel Company, Pittsburgh, Pennsylvania
Climax Molybdenum Company, 500 Fifth Avenue, New York, N. Y.
Crucible Steel Company of America, 17 East 42nd Street, New York, N.Y.
Cyclops Steel Company, Titusville, Pennsylvania
Donner Steel Company, Buffalo, New York
Firth-Sterling Steel Company, McKeesport, Pennsylvania
Interstate Iron and Steel Company, 104 South Michigan Avenue, Chicago, Illinois
Latrobe Electric Steel Company, Latrobe,Pennsylvania

Ludlum Steel Company, Watervliet, New York
Republic Steel Corporation, Cleveland, Ohio
Simonds Saw and Steel Company, Lockport, New York
Tacony Steel Company, Tacony, Philadelphia, Pennsylvania
The Carpenter Steel Company, Reading, Pennsylvania
The International Nickel Company, 67 Wall Street, New York, N. Y.
The Midvale Company, Nicetown, Philadelphia, Pennsylvania
Timken Steel and Tube Company, Canton, Ohio
Titanium Alloys Manufacturing Company, Niagara Falls, New York
Universal Steel Company, Bridgeville, Pennsylvania
Vanadium Alloys Steel Company, Latrobe, Pennsylvania
Vanadium Corporation of America, Bridgeville, Pennsylvania

G. Foundry, cast iron and nonferrous metals

Ref.
G 1 Testing and grading foundry sands. Committee on Molding Sand Research. Am. Foundrymen's Assn. (1938).
2 Copper in cast steel and iron. Copper Development Assn., Millbank, London, England (1937).
3 Molybdenum in cast iron. Climax Molybdenum Corporation (1937).
4 Elementary foundry technology. L. A. Hartley. 2nd edn. The Penton Pub. Co. (1937).
5 Gray cast iron. J. E. Bolton. The Penton Pub. Co. (1937).
6 Metal casting. H. L. Campbell. J. Wiley & Sons (1936).
7 A manual of foundry practice. J. Laing and R. T. Rolfe. The Sherwood Press (1935).
8 Cast metals handbook. Am. Foundrymen's Assn. (1935).
9 Die castings. H. L. Chase. J. Wiley & Sons (1935).
10 Gates and risers for castings. P. Dwyer. The Penton Pub. Co. (1935).
11 Steel foundry. J. H. Hall. McGraw-Hill Book Co. (1935).
12 Electric melting practice. A. C. Roblette. J. B. Lippincott Co.(1934).
13 Symposium on cast iron prepared by Am. Foundrymen's Assn. and Am. Soc. Testing Materials (1933).
14 Effect of elevated temperatures on certain mechanical properties of gray cast iron and malleable iron. Symposium on Effect of Temperatures on the Properties of Metals. J. W. Bolton and H. Bornstein. Am. Soc. Testing Materials and Am. Soc. Mech. Engrs. (1931).
15 Die castings. Marc Stern. McGraw-Hill Book Co. (1930).
16 The principles of iron founding. R. Moldenke. 2nd edn. McGraw-Hill Book Co. (1930).
17 Melting iron in the cupola. J. E. Hurst. The Penton Pub. Co. (1929).
18 Cast iron in the light of recent research. W. H. Hatfield. 3rd edn. C. Griffin & Co. (1928).
19 Foundry sand, its uses and abuses. E. W. Smith. For sale by the author, Chicago (1926).
20 Metal spraying. T. H. Turner and N. F. Budgen. J. B. Lippincott Co. (1926).
21 Industrial Furnaces. J. Fairks. 2 vols. J. Wiley & Sons (1925).

G. Foundry, cast iron and nonferrous metals (continued)

G 22 American malleable cast iron. H. A. Schwartz. The Penton Publishing Co. (1922).
23 Practical iron founding. P. G. Korner. Sir I. Pitman & Sons (1920).
Also references: C4, C16, E5, E10, F25, F38, Nell, Nf14, Ng3, Ng6, Ng7.

H. Individual metals

Ha - Aluminum

Ref.

Hal The technology of aluminum and its light alloys. Alfred vonZeerleder. Trans. A. J. Field, Gustav Fock, 145 W. 44th Street, New York, N. Y. (1936).
2 Metallography of aluminum and its alloys. V. Fuss. Trans. R.J.Anderson. The Sherwood Press (1935).
3 Aluminum and its alloys. N. F. Budgen. Sir I. Pitman & Sons (1933).
4 Service characteristics of light metals and alloys. Committee B-7. Am. Soc. Testing Materials (1932).
5 Secondary aluminum. R. J. Anderson. The Sherwood Press (1931).
6 The aluminum industry. 2 vols. J. D. Edwards, F. C. Frary and Z. Jeffries. McGraw-Hill Book Co. (1930).
7 Light metals and alloys. Circular, National Bureau of Standards C346. Superintendent of Documents (1927). $1.10.
8 Working of aluminum. E. T. Painton. Chapman & Hall (1927).
9 Aluminum, the metal and its alloys. M. G. Corson. D. Van Nostrand (1926).
10 Metallurgy of aluminum and aluminum alloys. R. J. Anderson. H. C. Baird & Co. (1925).
11 Aluminum in aircraft. Aluminum Company of America, Pittsburgh, Pa.
Also references: C3, E3, E18, E20, Nc5, Nf8.

The Aluminum Company of America, 801 Gulf Building, Pittsburgh, has prepared technical pamphlets which discuss aluminum, its alloys and their industrial uses which are usually sent on request.

Hb - Antimony

Ref.

Hb1 Antimony. C. Y. Wang. 2nd edn. C. Griffin & Co. (1923).
Also references: E2, E20.

Hc - Arsenic

Ref.

Hc1 Handbook of nonferrous metallurgy. Chapter XII of Volume 2. Arsenic. W. C. Smith. McGraw-Hill Book Co. (1926).
Also references: E2, E20.

Hd - Beryllium

Ref.

Hd1 Beryllium, its production and application. Trans. R. Rimbach and A. J. Michel. Reinhold Publishing Co. (1932).

Also references: E3, E20, Ha7.

He - Bismuth

Ref.

He1 Bismuth. J. G. Thompson. Circular, National Bureau of Standards C382. Superintendent of Documents (1930). 10 cents.

Also references: E3, E20.

Hf - Cadmium

Ref.

Hf1 Cadmium, its metallurgy, properties and uses. N. F. Budgen. C. Griffin & Co. (1924).

Also references: C3, E3, E20.

Hg - Calcium, barium, lithium, etc.

See references: C3, E3, E20.

Hh - Chromium

See references: E3, E20.

Hi - Cobalt

Ref.

Hi1 Cobalt, nickel and the elements of the platinum group. Vol. IX. J. A. N. Friend. C. Griffin & Co. (1922).

Also references: E3, E20.

Hj - Copper

Ref.

Hj1 Commercially important copper alloys. Chase Copper and Brass Co., Waterbury, Connecticut (1936).

2 Arsenical and argentiferous copper. J. L. Gregg. Reinhold Publishing Co. (1934).

3 Metallurgy of copper. H. O. Hofman (Revised by C. E. Hayward). 2nd edn. Mining & Metallurgy, 29 West 39th Street, New York, N.Y.(1934).

4 The story of copper. W. Davis. The Century Company, 352 Fourth Ave., New York, N. Y. (1924).

Also references: C3, E3, E20, F26, Nf5.

Pamphlets relating to the various industrial uses of copper are available from the following:- The Copper and Brass Research Association, 420 Lexington Avenue, New York, N. Y., and Copper Development Association, London, England.

Hk - Gold

Ref.

Hk1 The metallurgy of gold. T. K. Rose and M. A. C. Newman. 7th edn. J. B. Lippincott Co. (1937).
2 Working in precious metals. E. A. Smith. 2nd edn. N.A.G. Press, Ltd., London (1937).
3 Gold alloys. G. E. Gee. C. Lockwood & Son, London (1929).

Also references: C3, E3, E4, E20, E21.

Hl - Lead

Ref.

Hl1 Useful information about lead. Lead Industries Assn., 420 Lexington Ave., New York, N. Y. (1931).
2 Lead, the precious metal. O. C. Harn. The Century Company (1924).
3 Lead, its occurrence in nature, the modes of its extraction, its properties and uses. J. A. Smythe. Longmans, Green & Co. (1923).

Also references: C3, E3, E20.

Lead Industries Assn. also issues "Lead", a quarterly publication, and some other technical pamphlets.

Hm - Magnesium

Ref.

Hm1 Magnesium. American Magnesium Corporation, Cleveland, Ohio (1923).

Also references: C3, E3, E20, Ha7.

The Dow Chemical Company, Midland, Michigan has issued several pamphlets on the subject. Two outstanding ones are "Dowmetal" and "Dowmetal Laboratory Methods".

Hn - Manganese

Ref.

Hn1 Manganese: its uses, preparation, mining costs and production of ferro-alloys. C. M. Weld and others. Bureau of Mines Bul. 173. Superintendent of Documents (1920).

Also reference: E3.

Ho - Mercury

Ref.

Ho1 Metallurgy of quicksilver. L. H. Duschak and C. N. Schuette. Bureau of Mines Bul. 222. Superintendent of Documents (1925).

Also references: E3, E20.

Hp - Molybdenum

Ref.

Hp1 Molybdenum in steel. Climax Molybdenum Corporation (1938).
2 Molybdenum in cast iron. Climax Molybdenum Corporation (1937).
3 Molybdenum. V. L. Eardley-Wilmot. Canada Department of Mines, Ottawa (1925).

Also references: E3, F29, F44.

The Climax Molybdenum Corporation, 500 Fifth Avenue, New York, N. Y. issues a pamphlet monthly entitled "Moly-Matrix". The Molybdenum Corporation of America, Pittsburgh, also issues pamphlets.

Hq - Nickel

Ref.

Hq1 Nickel: the mining, refining and applications of nickel. F. b. H. White. Sir I. Pitman & Sons (1923).

Also references: C3, E3, E20, F47.

The International Nickel Company, 67 Wall Street, New York, N. Y. distributes several series of pamphlets dealing with nickel and nickel alloys.

Hr - Platinum and related metals

Ref.

Hr1 Platinum metals. F. A. Smith. Sir I. Pitman & Sons (1925).

Also references: C3, E3.

The various platinum manufacturers have issued technical pamphlets on platinum:- Baker & Co. Platinum Works, Newark, New Jersey; Sigmund Cohn, 44 Gold Street, New York, N. Y.; J. Bishop & Co., Malvern, Pennsylvania.

Hs - Silicon

Ref.

Hs1 Reference Ha7.

Also references: E20, F28.

Ht - Silver

Ref.

Ht1 The book of old silver - English, American, foreign. S. B. Wyler. Crown Publishers, New York, N. Y. (1937).

2 Working in precious metals. E. A. Smith. 2nd edn. N.A.G. Press, London (1937).

3 Der aufbau der Zweistofflegierungen (The structure of binary alloys). M. Hansen. Julius Springer, Berlin (1936).

4 Silver: its properties and industrial uses. B. A. Rogers, I. C. Schoonover and L. Jordan. Circular, National Bureau of Standards C412. Superintendent of Documents (1936). 10 cents.

5 The Handy book for jewelers. Handy & Harman (1935).

6 The making of mirrors by the deposition of metal on glass. Circular, National Bureau of Standards C389. Superintendent of Documents (1931). 5 cents.

7 Silver, its history and romance. Benjamin White. 2nd edn. Waterlow and Sons, Ltd., London (1920).

Also reference: E3.

Hu - Tin

Ref.

Hu1 Tin. C. L. Mantell. Reinhold Publishing Corporation (1929).

2 Tin and the tin industry; the metal, history, character and application. A. H. Mundey. Sir I. Pitman & Sons (1925).

Also references: C3, E5, E20, F36.

The International Tin Research and Development Council, 149 Broadway, New York, N. Y. from time to time issues pamphlets dealing with tin and its various uses.

Hv - Titanium

Ref.

Hv1 Titanium, with special reference to the analysis of titaniferous substances. W. M. Thornton. Reinhold Publishing Corporation (1927).

Also reference: E3.

Hw - Tungsten

Ref.

Hw1 Tungsten. C. J. Smithells. D. Van Nostrand (1927).

Also references: C3, E3, F27, J25.

The Fansteel Company, North Chicago, Illinois has issued pamphlets on tungsten, columbium, tantalum and other uncommon metals.

Hx - Uranium, Vanadium

Ref.

Hx1 Vanadium steels and irons. Vanadium Corporation of America, 420 Lexington Avenue, New York, N. Y. (1937).

Also reference: E3.

Pamphlets on vanadium are available for distribution by the above company (reference Hx1).

Hy - Zinc

Ref.

Hy1 Galvanizing. H. Bablik. Trans. M. Juers-Budicky. E. & F. N. Spon, London (1936).

2 La galvanisation a chaud (Hot galvanizing). C. Kluytmans. L'Usine, Paris (1936).

3 Zinc and its alloys. Circular, National Bureau of Standards C395. Superintendent of Documents (1931). 25 cents.

4 Zinc and its corrosion resistance. Am. Zinc Inst., 60 East 42nd St., New York, N. Y. (1928).

Also references: C3, E3, I3.

The American Zinc Institute issues a monthly bulletin entitled "Make It of Zinc". Address is given above. The New Jersey Zinc Company, 160 Front Street, New York, N. Y. also issues periodicals on zinc and its alloys.

Hz - Zirconium

Ref.

Hz1 Zirconium and its compounds. F. P. Venable. Reinhold Pub. Corp. (1922).

2 Investigations of zirconium. J. W. Marden and M. N. Piele. Bu. Mines Bul. 186. Superintendent of Documents (1921).

Also references: E3, F44.

Hzz - Rare metals

References E3, E4, E16.

I. General metallurgical subjects

Ref.

I 1 Die korrosion von nichteisenmetallen und deren legierungen (Corrosion of nonferrous metals and their alloys). Bd. II. O. Krönke and G. Masing. S. Hirzel, Leipzig (1938).
2 Handbuch der Metallbeizerei, Nichteisenmetalle (Handbook of metal pickling, nonferrous metals). O. Vogel. Verlag Chemie, Berlin(1938).
3 Hot-dip galvanizing practice. W. E. Spowers, jr. The Penton Publishing Co. (1938).
4 A manual of porcelain enameling. Ferro Enamel Corp. The Enamelist Publishing Company, Cleveland (1937).
5 Gases and metals. C. J. Smithells. J. Wiley & Sons (1937).
6 Industrial minerals and rocks. Am. Inst. Min. Met. Engrs. (1937).
7 La fatigue des metaux (The fatigue of metals). R. Cazaud and L.Persoz. Dunod, Paris, 92 Rue Bonaparte (VI) (1937).
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