



Cold Facts

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Book Review

By Dr. Randall Barron, Louisiana Technical University, rbarron@bayou.com

"Transformations in Metals," by Paul G. Shewmon, pub. Indo American Books, 2006.

This book would have limited utility for most engineers and scientists working in the cryogenic field, because it has no discussion of sub-zero phenomena. There is, however, an excellent section on martensite transformation (Chapter 8). A person who is active in the cryogenic treatment of metals would benefit from studying this chapter. Although this is not presented, the material does help one understand why cryogenic treatment of tool steels requires low temperatures (around 80K) in addition to a long soak (24 hour) at the low temperatures to produce some fine carbide particles.

Another topic of interest to cryogenic engineers and scientists is that of hydrogen embrittlement, presented in Section 9-6 of the book. Although low-temperature applications are not discussed, the physical background responsible for hydrogen embrittlement is clearly presented.

The book is one of the most clearly written and readable books on metallurgy that I have seen. The mathematics supplements the explanations of physical phenomena quite well. It is commendable that the author has chosen the writing style of starting with the simpler con-

cepts and progressing to the more complex ideas.

The author begins with a discussion of one of the more important and basic features of metals—dislocations. This topic is followed by a treatment of diffusion in solids, which governs many of the time-dependent processes in metal treatment. The student would have a firm foundation for understanding metallurgy phenomena after mastering these two areas.

Chapter 6, dealing with phase transformations, is well organized. The physical phenomena responsible for the transformations and the resulting microstructure are clearly explained, especially for the technically important iron-carbon system.

One possible weakness of the text is that it uses the out-dated cgs system of units. In the metallurgy field, units such as kcal/mole (as in Table 2-2) are commonly used; however, workers in the cryogenic fields, who may need to understand some metallurgy phenomena, often use the SI (mksa) system of units, such as kJ/mol. In fact, most society journals, such as those of the ASME, AIChE and ASCE, require the use of the SI units in technical papers published in these journals.

Spotlight on Sustaining Member

Chart Introduces New MVIPTM Product



Chart Industries, Inc. Distribution and Storage Group (Chart D&S) announces the release of its latest innovation, Modular Vacuum Insulated Pipe (MVIPTM). Chart's MVIPTM is a completely modular approach to vacuum insulated piping systems. The MVIPTM product offering includes a complete selection of standard piping modules such as straight sections, elbows, tees and valves that are all vacuum-insulated with bayonet connections. The bayonet connections provide a very simple, efficient and proven connection system that has been used for over 20 years. The MVIPTM product is easy to install with simple tools in accordance with instructions—requiring no cutting, soldering, welding or foam insulating.

"Traditional vacuum insulated pipe (VIP) systems are custom engineered and manufactured to site-specific drawings, which makes a system highly customized and difficult to re-use should the system need any re-configurations in the future. A system with standard modules,

MVIPTM can easily be pulled apart and reconfigured to create a new system design," stated Jim Weiler, Chart D&S Director of Engineered Systems. "Building standard modules allows Chart D&S to build inventories to forecast rather than build to a specific customer order. This will reduce our customers' over-all lead-time as the traditional delays of system measurement, design, drawing creation, approvals, planning and manufacturing of a custom-engineered VIP job are eliminated. Customers can afford to keep small inventories of standard modules on hand knowing they can be used for numerous vacuum-insulated pipe requirements," Weiler added.

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