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Editorial

In October, I attended a University Materials Council (UMC) meeting and heard shocking news about phase diagrams. The UMC is a group of chairs and heads of Materials Science and Engineering (MSE) departments in the United States who meet twice a year. The news came while we were discussing required courses for graduate students and the pressure to introduce new topics such as biology into the curriculum. One chair admitted that his department no longer requires graduate students to take a course on phase transformations. Others said that they too had eliminated the topic from their required courses. That led me to ask if their graduating Ph.D.s knew how to read ternary phase diagrams. The shocking news was that few thought that any of their Ph.D.s could do that. It is ironic to think that as our ability to predict phase diagrams improves, the ability of our colleagues to read them may be declining.

In a few weeks I will teach a ten-week course on phase diagrams to about 90 undergraduate engineering students. When the course was taught last year, the students' major criticism was that there was no textbook used in the course. This year a book search on Amazon.com yielded few choices. For graduate students, there was the brilliant treatise by Mats Hillert published in 1998 and a new book by Predel, Hoch, and Pool due in 2005. However for undergraduates, the only book was that by West and Saunders published in 2002 with a focus on ternary systems.

Needing a more multicomponent approach, my solution will be to copy the out-of-print book *Phase Diagrams in Metallurgy* written by Fred Rhines in 1956. The cost to students will be minimal even when including the cost of copyright permission. Rhines states that his mission is "… to present the subject in a manner that can be grasped by undergraduate engineering students whose primary interest is in the application of phase diagrams to metallurgical problems. To this end, the treatment of thermodynamic principles has been reduced to a minimum…" When teaching the course I will include some additional information on thermodynamics, ceramics, and phase diagram topology, but my goal will be the same as Rhines's: When students complete the course, they will know how to read phase diagrams and apply them to solving practical problems.

It is not the point of this editorial to encourage people to copy out-of-print books, but to make a connection between the lack of phase diagram textbooks for undergraduates with the lack of interest in phase diagrams at the graduate level. If students do not understand the value of these diagrams, then what will motivate them to learn more and join our community? In any case, more new and improved textbooks for undergraduates would improve the phase diagram literacy of the next generation of MSE graduates.

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