

## **important chemical engineering publications . . .**

### **THERMODYNAMICS**

**By William C. Reynolds, Stanford University. 458 pages, \$9.50.**

Designed for a fundamentally oriented first course in thermodynamics, this unique text provides an understanding of macroscopic thermodynamics not possible in classical treatments. The subject is developed retaining the generality and simplicity of purely macroscopic thermodynamics but utilizing microscopic insights. This approach integrates microscopic and macroscopic concepts to provide a common conceptual foundation for thermodynamics and quantum statistical mechanics.

### **PROCESS SYSTEMS ANALYSIS AND CONTROL**

**By DONALD R. COUGHANOWR and LOWELL B. KOPPEL, both of Purdue University. McGraw-Hill Series in Chemical Engineering. 491 pages, \$15.50.**

Presents a well-organized, lucid, and self-motivating discussion of the principles and application of automatic control theory. Distinctive in its broad coverage which includes newer approaches to control theory: stability, root locus, non-linear techniques, and analog computers. The basic approach is to follow each new principle or computational technique with an interesting example.

### **PROCESS CONTROL**

**By PETER HARRIOTT, Cornell University. McGraw-Hill Series in Chemical Engineering. 448 pages, \$13.50.**

A senior-graduate level text which provides an introduction to the theory of automatic control and its application to chemical process industries. Emphasis is on the dynamic behavior of processes and processing equipment rather than on the mechanical features of instruments and controllers.



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difference in pressure from nozzle to atmosphere is large enough that volatiles within the particle (absorbed water) flashes off, thus rupturing and expanding particles in a manner similar to puffed wheat and rice "shot from guns."

#### *Fuel-Cell Powered Lawn Mower*

Various hydrogen-oxygen fuel cells were constructed and tested. It was concluded that the cost of a fuel-cell-powered mower would prohibit its competitiveness at present. This high cost is due to the catalyst-plated electrodes presently required. An investigation of optimum design and reliability was also undertaken. (*This project later resulted in an NSF undergraduate Research Participation grant of \$6,250.*)

#### *Flame Tube Studies*

A combustion tube was constructed to investigate transient and non-transient uniform flame fields. The tube was designed with all attending measurement equipment; the stainless steel tube was built upon a metal frame, then placed upon a concrete pad and enclosed by three concrete block walls. This tube was fired four times with acetylene gas as the fuel and the resultant combustions were observed.

#### *Shock Tube*

An electric shock tube was designed and built to produce shock front velocities up to ten Mach. The shocks are generated by the fast discharge of capacitors into the driver section of the tube.

The interest of senior students in their projects has been tremendous and some real progress in certain areas of engineering has been made. Several patents are being applied for, several industrial companies have paid to sponsor projects of immediate interest to them as a result of knowing the type of work done, and additional companies have indicated interest in next year's projects.

The students have truly had a unique involvement in engineering through interdisciplinary creative projects and the entire aspects of our curriculum. With three years of operation of the new program it is still too early to have accurate feedback from job performance of our students. However, the faculty believes that the program just described will contribute heavily to the future development of these engineering graduates. The authors believe the students have been given a lasting education and have developed a professional attitude.

#### **Editor's Note:**

The Appendix on the following page completes this article.

