

## Book Review

**Modern Thermodynamics: From Heat Engines to Dissipative Structures.** By Dilip Kondepudi (Wake Forest University) and Ilya Prigogine (University of Texas at Austin). Wiley: Chichester, UK. 1998. 486pp. £24.95. ISBN 0-471-97394-7.

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For readers interested in the Prigogine school of thermodynamics, this book is the first choice because it is a textbook. Conventionally textbooks are places where only mature theories are described and carefully presented [1]. The other important source is Prigogine's Nobel lecture [2]. The representative original literature is listed in this book, particularly on page 455.

This book is in contrast to other thermodynamic textbooks regarding time. Many other authors of thermodynamic texts insist that thermodynamics is independent of time. However, here time and the "arrow of time" have been mentioned frequently and time  $t$  appears in mathematical expressions throughout this thermodynamics textbook, even in the first chapters where traditional thermodynamics is otherwise well presented. In order to avoid confusion for students, the reviewer (Lin) believes that time-dependent phenomena and theories should be discussed elsewhere in the context of chemical kinetics, and fluid dynamics, etc., not in thermodynamics [3].

Traditionally thermodynamics also discusses the open system and nonequilibrium. Prigogine has introduced a dissipative structure concept and mathematical equations for entropy  $S$  and time  $t$  for the open system and nonequilibrium. These are presented in chapters 12-18. The dissipative structure is defined as being really far from the equilibrium case. However, the higher-order terms in the Taylor series of entropy expression of fluctuation cannot be neglected if the considered system is really far from equilibrium (Chapter 18). Readers must duly have expected the earnest application of this en-

tropy theory in the final two chapters. However, only many familiar equations of chemical kinetics have been applied. Amazingly the symbol of entropy  $S$  did not appear once in any of the many equations in Chapter 19, Dissipative Structures.

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### References and Notes

1. Several books co-authored by Prigogine were published recently. For example, Stengers, I.; Prigogine, I. *The End of Certainty: Time, Chaos, and the New Laws of Nature*, Free Press: New York, 1997.
2. Prigogine, I. Time, structure, and fluctuations. *Science* **1978**, *201*, 777-785.
3. Lin, S.-K. Editorial: diversity and entropy. *Entropy* **1999**, *1*, 1-3.  
(<http://www.mdpi.org/entropy/htm/e1010001.htm>).