

Book Review of Green Analytical Chemistry

Green Analytical Chemistry. By Mihkel Koel and Mihkel Kaljurand (both at Tallinn University of Technology, Tallinn, Estonia). Royal Society of Chemistry: Cambridge. 2010. x + 320 pp. \$109. ISBN 978-1-84755-872-5.

Analytical chemistry appears to be slower than other chemistry disciplines in embracing the concept of green chemistry. This is somewhat puzzling given the fact that analytical techniques are vital for identifying and monitoring the waste and hazards important in developing green processing and that many analytical instruments are marketed on the relative merits of their “greenness,” just like housewares and consumer products. Thus, it is refreshing to see this tome by Koel and Kaljurand, the first book devoted solely to green analytical chemistry.

The authors present three options for decreasing environmental inputs: technical approaches, education, and substitution. To accomplish this, they provide (1) an outline of approaches, generally instrumental, to greener analytical procedures; (2) a general education on the topic for analysts; and (3) a thorough discussion regarding the substitution of more benign materials, such as solvents, for those that may be hazardous. Importantly, the safety and toxicity of the substitutes are not the only issues considered, but the energy inputs associated with their use are also given their due.

Koel and Kaljurand begin by presenting an overview of both analytical and green chemistry. Next they describe current trends in analysis, including microfluidics, sensors, miniaturization, and reflectance spectroscopy, that impart a greener perspective. Finally, in Chapter 6, various methods for treating data, such as chemometrics and quantitative structure–activity relationships, are discussed. This final discussion is of interest because most chemists simply look at the analytical result but do not manipulate the results in a manner that can provide the appropriate, desired information, sometimes with fewer analyses.

My one major objection with this book is that analytical chemistry is presented as a tool, perpetuating the stereotype that analytical data are simply a support to other scientific efforts. In actuality, analytical chemists must be scientific partners with research teams developing new technology, products, or processes. The practice of analytical chemistry can be considered a thought process, just as green chemistry is the use of a set of green chemistry principles. Unfortunately, important areas where analytical chemistry and green chemistry meet, especially the design of experiments, sampling protocols, and concepts like analytical selectivity, are omitted or given only limited treatment in this treatise.

Despite my objection to the philosophical nature of chemical analysis, the book is a worthwhile addition to analytical libraries. At least two edited books on green analytical chemistry are scheduled for publication in 2011, so although the Koel and Kaljurand book may be considered obsolete by then, it is more

likely that this book and the next few books in this rapidly developing field will share complementary perspectives.

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