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Book review

Structure and Reactivity; edited by J.F. Liebman and A. Greenberg. VCH Verlagsgesellschaft Weinheim, Basel, Cambridge, New York, 1988, 385 pages, DM 195.-. £66.-. ISBN 0-89573-712-4 (New York), ISBN 3-527-26958-4 (Europe)

It would be nice to see a book presenting the evidence both theoretical and experimental for some correlation between molecular structure and molecular reactivity. It is, of course, a big topic because of the wide variety of chemical families and the wide variety of reaction types. I can therefore understand that a multi-authored book may be the only feasible solution even though this requires a considerable input from the editors to get cohesion between the chapters. It was therefore with some enthusiasm that I opened this book of edited articles on structure and reactivity but found to my disappointment that it contains a series of unrelated chapters some dealing with structure, some with reactivity, but few exploring the link between the two.

Standing alone the chapters are not uninteresting: one on the photoelectron spectra of matrix isolated unstable species, one on explosive materials, one on the X-ray determination of electron densities, and one on twisted bicyclic lactams. It would be a very catholic reader who would try them all. Of the chapters that do attempt to tackle structure reactivity relationships in more general terms, there is a nice one by Cremer and Kraka on the concept of bond strain, and one by Mitsuhashi on polar effects on homolytic and heterolytic cleavage of carbon-carbon bonds. There is also a chapter by Krygowski on how resonance structure contributions can be deduced from molecular geometry. The particular model favoured by this author gives resonance energies which correlate well with more conventional methods.

Finally, but actually first in the book, there is an article by Politzer and Murray on deviation indices and electrostatic potentials of strained hydrocarbons. In its topic this has considerable overlap with the article by Cremer and Kraka but there is an almost total absence of any references by the authors of one article to the published work of the others. The editors have clearly decided to let the readers decide for themselves what is the best approach to bond strain, but if one pays a high price for a book one might expect some guidance.

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