



STRUCTURAL SCIENCE
CRYSTAL ENGINEERING
MATERIALS

ISSN 2052-5206

Co-crystals. Preparation, Characterization and Applications. Edited by C. B. Aakeröy and A. S. Sinha. Royal Society of Chemistry, Monographs in Supramolecular Chemistry No. 24, 2018, Hardcover, pp. 342. Price GBP 159.00. ISBN 978-1-78801-115-0

Gautam R. Desiraju*

Solid State and Structural Chemistry, Indian Institute of Science, CV Raman Road Bengaluru, Karnataka, 560012, India.
*Correspondence e-mail: gautam.desiraju@gmail.com

Keywords: book review; co-crystals.

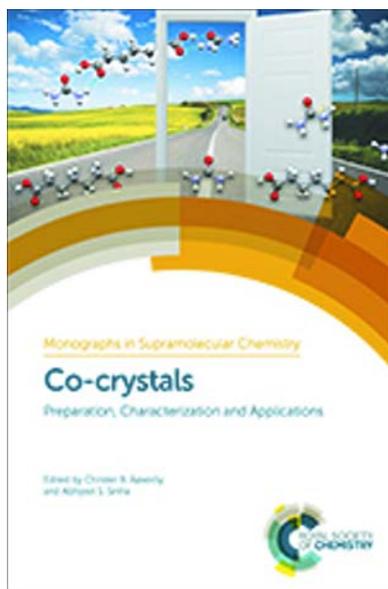
The main challenge in compiling a multi-author volume is that the various chapters become quite disparate in terms of rigour, coverage and style leading to a rather unsatisfying outcome. With this always present danger, the editors of the present book on co-crystals have done an admirable job and have even exceeded expectations in providing us with a timely and extremely useful book—and this is an added challenge—in a fast moving area of fundamental and practical importance.

Co-crystals are very appealing to the researcher because the motivations for their study span a wide range of philosophies. One tries to make a co-crystal, especially the ones with three and more components in them, simply because they are difficult to make. One tries to make a co-crystal because the very fact that a particular co-crystal is obtained and how it was obtained might tell us something about the crystallization pathway. One tries to make a co-crystal because one is trying to optimize a particular property and function. This book addresses all these three motivations.

The structure of the book itself is well thought out. All the authors are scholars of international repute and a few of them have laid the basic foundations of the field of co-crystals in the context of crystal engineering. It testifies to the abilities and resourcefulness of the editors to have secured contributions from all these experts.

The three first chapters (by the editors, the Zaworotko group, and Topić and Rissanen) deal with the core fundamental principles in the design of co-crystals. The first chapter, written by the editors, gives a broad framework for the book itself. The second and third chapters deal with hydrogen bonding and halogen bonding. The former is usually the interaction of choice but the latter is fast catching up and I found the references in these two chapters to be up to date. It was a pleasant surprise for me to see so many co-crystals reported with halogen bonds in them. This interaction will undoubtedly become more important in the field in the coming years, especially with regard to higher co-crystals with three and more molecular constituents in them. Chapter 4 by Friščić is a sort of bridging chapter in that it is both synthetic- and property-oriented. Chapters 5 through 8 (Aitiamula *et al.*, Kennedy & Pulham, Fourmigué & Jeon, Hutchins & MacGillivray) each concentrate on a particular property: pharmaceuticals; energetic materials; paramagnets; semiconductors. These chapters are very interesting because underlying all of them is a simple fact: the act of co-crystallizing two compounds can result in the creation or enhancement of a particular property. These chapters are therefore useful to crystal engineers who might be interested in other properties too (mechanical properties notably are not covered excepting Chapter 4 that touches on mechanochemistry) because these chapters convey the general approaches towards making better materials through co-crystal technology. One should not forget that property-oriented co-crystals existed long before even crystal engineering had a coherent identity. I am referring of course to the organic superconductors of the TTF-TCNQ type that were first reported in 1973. Things come around in science and the present set of these four property-oriented chapters constitute a nice formal recording of where we are now in this particular game.

The final chapter, again by the editors, is about co-crystallization as a versatile tool in separations technology. This chapter is a bit of an enigma to me at any rate and I was wondering if it could have been placed just after Chapter 4 for better flow. There is



© 2019 International Union of Crystallography

certainly a lot more that could be said about co-crystals in the separations business today. Another possibility might have been to duck on this particular issue for now and expand this particular sub-theme into a whole book in a few years.

I speak about such issues because in these days of information overload, social media, the profusion of journals and conferences, and basically the very short attention spans we have all unfortunately developed towards scientific matters, even in our various fields of choice, it is a real challenge to

even think of editing books. A great deal of work goes into the production of these books and one would want the final product to be disseminated optimally and to be found useful by the readers. The authors have done well in this effort. I would say that one would be able to access information—and again I say, in a fast moving field—from this book far easier than using a panoply of computer aided information gathering methods. In this respect, this particular volume is a success and I congratulate the editors and the authors.