## Crystal Engineering

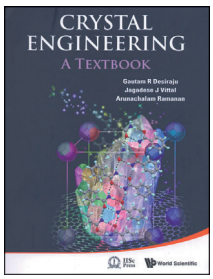
*Crystal Engineering: A Textbook* wraps up in a single book the basics of almost three decades of interdisciplinary research across the boundaries between the supramolecular, materials, and solid–state specializations of chemistry. The book is authored by Professors Gautam Desiraju (IIS, Bangalore), Jagadese J. Vittal (National University of Singapore), and Arunachalam Ramanan (IIT, Delhi), and is published by IISc Press and World Scientific Publishing of Singapore.

A textbook on crystal engineering 22 years after the milestone publication of *Crystal Engineering: The Design of Organic Solids* by Desiraju himself? That is a long time lapse for a field of research. Much has happened in those twenty years, many papers and reviews have been published, meetings and summer schools have taken place, even specialist journals have been launched and have established themselves amongst the top quality publication sites. Such development only happens for broad and mature research fields. Thus, it is not surprising that such maturity has now generated a need for adequate tools to teach the basics of "making crystals with a purpose". This is what crystal engineering is about: "making" entirely new classes of crystalline materials through a strategy that uses molecules as building blocks, which are selected on the basis of their supramolecular and/or coordination-bonding capacity. Crystal engineering is not a purely academic exercise, rather it is a way of understanding and planning how to achieve collective properties from molecular properties. Therefore, the early definition of crystal engineering as "*the understanding of intermolecular interactions in the context of crystal packing and the utilization of such understanding in the design of new solids with desired physical and chemical properties*" still holds, and is reflected in the book.

When I began teaching my undergraduate students the elements of crystal engineering within a course on materials chemistry, I immediately realized how difficult it was to persuade students of the relevance of the subject in the absence of a textbook! Especially in view of the interdisciplinary growth of the field through the years (with research activities that range from porous materials to gas storage and to sensing, from pharmaceutical compounds to agrochemicals, from solid–solid reactions to solid–gas reactions and to host–guest compounds, from spectroscopy to crystallography and computational approaches to crystal structures, and so on) I managed for several years with bits and pieces of articles picked up from specialized journals, PowerPoint presentations, and fragments of reviews or chapters of books. But the overall effect was always unsatisfactory: there was no way to tie things together in a "story" that one could tell to students in a consistent manner. There were, of course, many single-author and multi-author books that could be used, but none that were written to be used as a textbook. Therefore, this year I was very happy when at last I could tell my students that a book on crystal engineering is available for their studies.

*Crystal Engineering: A Textbook* is not a reference book but an entry point to the field for beginners, for students, and for everyone who is willing to look at solid state chemistry and crystallography from a less traditional angle. The book is organized in seven chapters in a logical order of presentation, from a historical introduction and fundamentals to frontier topics. The first two chapters, which deal with the principles of crystal engineering and the investigation of intermolecular interactions, are followed by a discussion of supramolecular design strategies and of crystallization and crystal growth methods. The remaining three chapters concentrate on topics that are at the forefront of scientific and technological interests, namely polymorphism, multicomponent crystals, and coordination polymers. Importantly, each chapter provides a selection of entry points into the relevant literature, with a selection of papers and reviews that will remain important over time. Even more relevantly, each chapter offers a number of problems that are useful in teaching. If any aspect leaves something to desire it is that of the graphics and figures, which could have been larger if the whole page width were used rather than columns. The result of the columns format is that much page space is left unused. The glossary, on the other hand, is very useful. Importantly, the book has a very affordable price, which is nowadays a precondition, together with quality and clarity, to be successful as a textbook.

All in all, the long awaited publication of *Crystal Engineering: A Textbook* will be greatly appreciated by the community of crystal engineers and solid state chemists.

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