

Book review

The Combinatorial Index

by Barry A. Bunin, Academic Press, 1998.
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The anticipated benefits of combinatorial chemistry have ensured that many research groups, both academic and industrial, have applied their collective innovation to the development of novel library methods. Allied with this productivity has been a flow of new synthetic methods that are compatible with high-speed library generation. This deluge of new chemistry has been so intense that even experts have found it difficult to keep pace with the developments. Thus, *The Combinatorial Index* is exceptionally valuable, as the author has pulled together, into one volume, a thorough survey of all the various combinatorial synthetic methods.

The author, Barry A. Bunin, is well versed in real applications of combinatorial chemistry, having spent his apprenticeship in Prof. Jonathan Ellman's pioneering solid-phase chemistry group at Berkeley, and has since joined the biotechnology industry at Axys Pharmaceuticals. His first-hand experience makes him a natural choice for assembling this comprehensive treatise.

Bunin has mercifully spared us yet another review of the strategies of combinatorial chemistry, focusing instead on key synthetic chemistry. As would be anticipated, he lists the solid-phase linkers and solid-phase synthetic methods, but additionally includes solution-phase methods that have been honed

for library preparation. He completes this comprehensive survey with descriptions of analytical methods, together with those fascinating hybrid techniques that lie at the interface of solid- and solution-phase approaches. The chemistry of soluble polymer supports, resin capture, support-bound reagents and fluorous chemistry are all described, providing the most comprehensive analysis to date of the sheer diversity of chemistry that has emerged to enrich combinatorial technology.

Dipping into the book demonstrates the wealth of information available for immediate reference. For every reaction, in addition to a clear reaction scheme, a list of 'points of interest' highlights the distinct features of each key step, and an experimental summary describes the reaction conditions. Naturally, full references are given, conveniently located immediately beneath the experimental description. Following a brief introduction and background chapter, Bunin lists and describes the confusing plethora of resin linkers available – using the 'points of interest' to identify the unique and differentiating features of each. Likewise, in the subsequent solid-phase synthesis chapter, for each reaction there is a thorough description of the generality of the reactions. This is a key point in combinatorial chemistry, as in the rush to generate hundreds or even thousands of analogues the chemist cannot devote time to checking every reaction, and some indication of the types of monomers that might be employed will increase the combinatorial chemist's

confidence in a successful library synthesis. A chapter on analysis summarises both chemical and spectrometric methods that have been used for monitoring solid-phase reactions. The final chapter covers solution-phase reactions and chemistry that exploits phase changes for the purification of library components. Valuable appendices further enlarge the scope of the book by tabulating functional group transformations, heterocyclization reactions, unnatural biopolymers and oligosaccharides.

I wholeheartedly recommend this volume for any chemist working in combinatorial chemistry, and those intrigued by the range of methods used in the production of compound libraries. For the average industrial or academic chemist who occasionally makes libraries, there are frequently times when it would be convenient to check whether a particular reaction has been translated to solid-phase or used for parallel solution synthesis. The book also scores on those occasions when it is necessary to check details of a vaguely remembered paper, and to this end, the index is an essential feature.

The Combinatorial Index offers a complete survey of combinatorial synthetic methods, but as in any rapidly expanding area, new additions to the literature will quickly and inevitably date the book. Despite this caveat, Bunin has compiled an essential text that should be in every laboratory.

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In short...

The **Anthony Nolan Trust** have been presented with an ÄKTA® purifier system (a new liquid chromatography system designed for fast and reliable separation of peptides, nucleic acids and proteins) that will improve bone marrow transplantation. The system was the first prize in an international competition organized by **Amersham Pharmacia Biotech**. The winner, Claire Morgan (a post-doctoral research scientist), was presented the prize at the Trust's annual charity ball at the Grosvenor House Hotel, London, UK on 25 April 1998. Morgan's team will use the system for research into cytomegalovirus (CMV), a virus which is harmlessly present in 50% of the population but which can cause complications (e.g. pneumonia) in bone marrow transplantation when the immune system is suppressed.