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BOOK REVIEWS

Conformation-Dependent Design of Sequences in Copolymers I and II. Advances in Polymer Science 195 and 196. Edited by Alexei R. Khokhlov (Moscow State University). Springer: Berlin, Heidelberg, New York. 2006. xiv + 238 pp. $239.00. ISBN 3-540-29513-5 (for I). xiv + 238 pp. $219. ISBN 3-540-29151-1 (for II).

The two-volume set edited by Khokhlov covers the design and synthesis of copolymers that are capable of mimicking the behavior of biological macromolecules, such as peptides and proteins, in an aqueous solution. All of the polymeric systems discussed are water-soluble and have the ability to exhibit globular behavior under appropriate conditions. The main theme throughout both volumes is a biomimetic approach to synthetic polymers that is termed "conformation-dependent sequence design" (CDSD). The physical basis behind CDSD and computer simulations of copolymerization and analogous polymer reactions, i.e., modification, that apply this concept are covered in exhaustive detail. The thermally induced folding of some water-soluble polymers, such as poly(*N*-isopropylacrylamide) and its derivatives, resulting in a transformation from a coil to a globule and the application of this folding behavior to sequence design are thoroughly reviewed. Along these same lines, the influence of temperature on colloidal stability of neutral amphiphilic polymers that have been dissolved in water and the theoretical background for utilizing these materials to form nanosized particles with controlled functions are also discussed in some detail.

The set is heavily weighted toward the theoretical side of CDSD, but it does contain sufficient experimental results for those in the physical and analytical areas of polymer chemistry. Overall, given the cost of this two-volume set, it is probably not of general interest to the entire polymer community; however, for scientists working in the areas of amphiphilic synthetic polymers, biomimetic approaches to polymers, and globular biopolymers, these volumes would be a great addition to their personal libraries. One suggestion for interested readers who are not overly familiar with the area would be to start with the final chapter of the second volume, since it provides a relatively straightforward discussion of the concepts and the purpose of the series.

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Topics in Stereochemistry, Volume 25. Edited by Scott E. Denmark (University of Illinois, Urbana-Champaign, USA) and Jay S. Siegel (University of Zürich, Switzerland). John Wiley & Sons, Inc.: Hoboken, NJ. 2006. xiv + 404 pp. $150.00. ISBN 0-471-68244-6.

Since the return of *Topics in Stereochemistry* in 1998, after a 5-year hiatus, the new editors Denmark and Siegel have commissioned two special issues. The first focused on the chirality of materials (Volume 24), whereas the present, complementary issue covers stereochemistry associated with the growth, structure, and reactivity of crystalline solids. Denmark and Siegel have turned the reins over to Guest Editor Fumio Toda who has solicited 9 chapters in addition to his own lead-off contribution on the separation of enantiomers in inclusion crystals.

Kostyanovsky and co-workers explore the tenuous boundary where molecules choose to precipitate as conglomerates or racemic compounds in a comprehensive accumulation of the literature that covers one and a half centuries. Still, many questions remain with respect to the control of crystal growth from a racemic mixture. The subtleties are underscored, perhaps intentionally, by their illustration of the difference between homochiral and heterochiral relationships with a color plate reproducing two paintings. The first painting, possibly the "first true image of homochirality in art", shows the Egyptian Queen Nefertari and the goddess Isis looking in the same direction in characteristic profile, but clasping hands, right to left. Heterochirality is ostensibly illustrated by Goncharova's painting "Two Spanish women in a garden" which features two women gazing forward, but each raising a fan with her right-hand! These are perfect emblems in the art world for twinned conglomerates that form optically inactive solutions. The crystallographic relationships come into focus at different levels of scrutiny.

Crystal engineering is covered largely in three chapters. Nishio and Umezawa take the C−H/π bond as the organizing structural motif in their essay. Nangia is more locally focused on the associations of amide linkages in pyrimidones and ureas. Goldberg, rather than focusing on particular intermolecular interactions, illustrates the many ways in which porphyrins can be organized into supramolecular crystalline structures. These chapters are richly illustrated with the results of single-crystal X-ray structure determinations. Despite the overwhelming reliance on the results of X-ray structure analysis throughout, J. Harada and Ogawa offer a caution: one must sometimes look beyond the ORTEP plot, as when dealing with dynamically disordered systems.

The two chapters by Kaupp and by Mortko and Garcia-Garibay cover reactivity in single crystals. They are a coherent pair with their emphases on thermal and photochemical processes, respectively. Whereas Kaupp reviews the expansive literature on thermally unstable crystalline solids and covers many reaction types, Mortko and Garcia-Garibay focus on work from the UCLA laboratories on the stereochemical integrity in the synthesis of quaternary centers by photodecarbonylation, but their contribution is well-centered within the larger conceptual issues surrounding stereospecificity in single-crystal reactions.

N. Harada gives an excellent overview of the resolution of racemic mixtures and the determination of absolute configuration, with an emphasis on the use of chiral auxiliaries in separating enantiomers and establishing the absolute sense of unknown stereogenic elements. Some developing methods are

missing, such as absolute structure determination by the three-beam measurement of crystallographic phases or the use of vibrational and even electronic optical activity of crystals.

The volume concludes with a brief chapter by Kato on fascinating thermochromic and vapochromic Pt(II) complexes. This contribution emphasizes the photophysical consequences of conformational changes of ligands in a highly responsive class of crystals.

In the aggregate, Volume 25 is a collection of excellent reviews on developed aspects of crystal stereochemistry. Less clear is where this field of study is headed. For example, discussions of stereochemistry on crystalline surfaces or the results of time-resolved X-ray diffraction, two exciting growth areas among others, are absent.

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