D8 Venture

This book explores the development of the first open-shell heavier tetrylidyne complexes featuring a tetrel-centered unpaired electron, and unprecedented metallatetrylidynes containing a multiply-bonded, linear-coordinated single heavier tetrel atom embedded between two metal centers. The chemistry of compounds featuring triple bonds of the heavier Group-14 elements Si–Pb with transition metals is a very challenging research area, which combines modern molecular main-group element with transition-metal chemistry, and is of fundamental importance for the understanding of chemical bonding. During the last 15 years, the research in this area has witnessed considerable progress in isolating a series of closed-shell tetrylidyne complexes. However, despite numerous attempts, open-shell tetrylidyne complexes and heavier group 14 element congeners of metallacarbynes and carbide complexes remained inaccessible. In this book, readers will find more about the synthesis, full characterization and reactivity studies of these novel complexes that uncovered a plethora of exceptional products, including a novel m3-silicido complex, the first dimetallasilacumulene with a linear, two-coordinated single silicon atom and the first compounds of planar tetracoordinated silicon (ptSi) (Anti-van’t Hoff-Le

Bell Silicon). Readers will also learn about the isolation and full characterization of the first room-temperature stable disilavinylidene, a silicon analogue of the very reactive vinylidenes (R2C=C:), and the first intermetallic plumbylidyne ligand transfer reactions.

Vols. for 1871-76, 1913-14 include an extra number, The Christmas bookseller, separately paged and not included in the consecutive numbering of the regular series.

An indispensable resource for researchers and students in materials science, chemistry, physics, and pharmaceuticals Written by one of the pioneers of 2D X-Ray Diffraction, this updated and expanded edition of the definitive text in the field provides comprehensive coverage of the fundamentals of that analytical method, as well as state-of-the art experimental methods and applications. Geometry convention, x-ray source and optics, two-dimensional detectors, diffraction data interpretation, and configurations for various applications, such as phase identification, texture, stress, microstructure analysis, crystallinity, thin film analysis, and combinatorial screening are all covered in detail. Numerous experimental examples in materials research, manufacture, and pharmaceuticals are provided throughout. Two-dimensional x-ray diffraction is the ideal, non-destructive analytical method for examining samples of all kinds including

metals, polymers, ceramics, semiconductors, thin films, coatings, paints, biomaterials, composites, and more. Two-Dimensional X-Ray Diffraction, Second Edition is an up-to-date resource for understanding how the latest 2D detectors are integrated into diffractometers, how to get the best data using the 2D detector for diffraction, and how to interpret this data. All those desirous of setting up a 2D diffraction in their own laboratories will find the author's coverage of the physical principles, projection geometry, and mathematical derivations extremely helpful. Features new contents in all chapters with most figures in full color to reveal more details in illustrations and diffraction patterns Covers the recent advances in detector technology and 2D data collection strategies that have led to dramatic increases in the use of two-dimensional detectors for x-ray diffraction Provides in-depth coverage of new innovations in x-ray sources, optics, system configurations, applications and data evaluation algorithms Contains new methods and experimental examples in stress, texture, crystal size, crystal orientation and thin film analysis Two-Dimensional X-Ray Diffraction, Second Edition is an important working resource for industrial and academic researchers and developers in materials science, chemistry, physics, pharmaceuticals, and all those who use x-ray diffraction as a characterization method. Users of all levels, instrument technicians

and X-ray laboratory managers, as well as instrument developers, will want to have it on hand. Recently, great attention has been paid to materials that can be used in the human body to prepare parts that replace failed bone structures. Of all materials, Ti-based materials are the most desirable, because they provide an optimum combination of mechanical, chemical, and biological properties. The successful application of Ti biomaterials has been confirmed mainly in dentistry, orthopedics, and traumatology. Titanium biocompatibility is practically the highest of all metallic biomaterials; however, new solutions are being sought to continuously improve their biocompatibility and osseointegration. Thus, the chemical modification of Ti results in the formation of new alloys or composites, which provide new perspectives for Ti biomaterials applications. This book covers broad aspects of Ti-based biomaterials concerning the design of their structure, mechanical, and biological properties. This book demonstrates that the new Ti-based compounds and their surface treatment provide the best properties for biomedical applications.

Business Plans Handbooks are collections of actual business plans compiled by entrepreneurs seeking funding for small businesses throughout North America. For those looking for examples of how to approach, structure and compose their own business plans, this Handbook presents sample plans taken

from businesses in the Pet Services industry -- only the company names and addresses have been changed. Typical business plans include type of business; statement of purpose; executive summary; business/industry description; market; product and production; management/personnel; and, financial specifics.

Reactions catalyzed by metalloenzymes have great potential for applications in the biotechnology and pharmaceutical industries. While only a few of these enzymes have yet been used in such applications, in the last few decades numerous efficient, selective, environmentally friendly and economical synthetic analogues have been described, including supramolecular, polymeric, nanoparticulate and lowmolecular- weight organometallic complexes, and metal organic frameworks. In this Research Topic, we present a collection of original research and review articles that show significant recent advances made in the rational design of such artificial metalloenzymes.

Mycotoxins are fungal secondary metabolites exhibiting adverse effects on humans, animals as well as crops, resulting in diseases and economic loss. Beticolins are mycotoxins produced by the fungus Cercospora beticola which is responsible for cercosporiosis, commonly known as leaf spot disease, causing heavy damages to crops worldwide. In order to study the mechanism of action of these biologically active compounds, this thesis

aimed at the development of synthetic approaches towards the highly complex polycyclic scaffold of beticolins. Beticolins consist of a chlorinated tetrahydroxanthone linked to an anthraquinone subunit via a unique bicyclo[3.2.2]nonane ring system. A facile route towards naphthoquinone derivatives and subsequent Diels-Alder cycloadditions with functionalized dienes afforded a highly functionalized anthraquinone subunit of beticolin 0. For the installation of a tetrahydroxanthone subunit, a synthetic route was elaborated. With the obtained anthraquinone derivatives intramolecular couplings were performed under different conditions, to facilitate the construction of the bicyclo[3.2.2]nonane ring system. The formation of the desired scaffold turned out to be challenging, however a variety of novel bicyclo[3.3.1]systems was obtained, representing interesting scaffolds. During a research stay at the University of Copenhagen, the functionalization of helical beta-peptoids was examined. Peptidomimetics adopting three-dimensional structures with well-defined display of functional groups while being resistant to proteolysis, are of interest for the development of foldamers with a desired function.

Molecular magnets show many properties not met in conventional metallic magnetic materials, i.e. low density, transparency to electromagnetic radiation, sensitivity to external stimuli such as light, pressure, temperature, chemical modification or magnetic/electric fields, and others. They can serve as “functional” materials in sensors of different types or be applied in high-density magnetic storage or nanoscale devices.

Research into molecule-based materials became more intense at the end of the 20th century and is now an important branch of modern science. The articles in this Special Issue, written by physicists and chemists, reflect the current work on molecular magnets being carried out in several research centers. Theoretical papers in the issue concern the influence of spin anisotropy in the low dimensional lattice of the resulting type of magnet, as well as thermodynamics and magnetic excitations in spin trimers. The impact of external pressure on structural and magnetic properties and its underlying mechanisms is described using the example of Prussian blue analogue data. The other functionality discussed is the magnetocaloric effect, investigated in coordination polymers and high spin clusters. In this issue, new molecular magnets are presented: (i) ferromagnetic high-spin [Mn6] single-molecule magnets, (ii) solvatomagnetic compounds changing their structure and magnetism dependent on water content, and (iii) a family of purely organic magnetic materials. Finally, an advanced calorimetric study of anisotropy in magnetic molecular superconductors is reviewed.

The Frontiers in Chemistry Editorial Office team are delighted to present the inaugural “Frontiers in Chemistry: Rising Stars” article collection, showcasing the high-quality work of internationally recognized researchers in the early stages of their independent careers. All Rising Star researchers featured within this collection were individually nominated by the Journal’s Chief Editors in recognition of their potential to influence the future directions in their respective fields. The work

presented here highlights the diversity of research performed across the entire breadth of the chemical sciences, and presents advances in theory, experiment and methodology with applications to compelling problems. This Editorial features the corresponding author(s) of each paper published within this important collection, ordered by section alphabetically, highlighting them as the great researchers of the future. The Frontiers in Chemistry Editorial Office team would like to thank each researcher who contributed their work to this collection. We would also like to personally thank our Chief Editors for their exemplary leadership of this article collection; their strong support and passion for this important, community-driven collection has ensured its success and global impact. Laurent Mathey, PhD Journal Development Manager

Creating antibacterial surfaces is the primary approach in preventing the occurrence and diffusion of clinical infections and foodborne diseases as well as in contrasting the propagation of pandemics in everyday life. Proper surface engineering can inhibit microorganism spread and biofilm formation, can contrast antimicrobial resistance (AMR), and can avoid cross-contamination from a contaminated surface to another and eventually to humans. For these reasons, antibacterial surfaces play a key role in many applications, ranging from biomedicine to food and beverage materials, textiles, and objects with frequent human contact. The incorporation of antimicrobial agents within a surface or their addition onto a surface are very effective strategies to achieve this aim and to properly

modify many other surface properties at the same time. In this framework, this Special Issue collects research studying several materials and methods related to the antibacterial properties of surfaces for different applications and discussions about the environmental and human-safety aspects.

This Special Issue contains original scientific papers in the field of mineral physics (and also rock physics). These papers are grouped into four categories: Reviews, Experimental Science, Theoretical Science and Technological Developments. These papers include those from first authors covering 5 generations of mineral physicists, including contemporaries of Orson [e.g., William Bassett, Frank Stacey], the next generation of leaders in mineral physics throughout the world [e.g., Michael Brown, Eiji Ohtani], current leaders in this field [e.g., Agnes Dewaele, Jun Tsuchiya], senior graduate students [e.g., Jan Borgomano, Vasilije Dobrosavlijevic, Francesca Miozzi], and an undergraduate student [e.g., Tyler Perez]. Mineral physics is the study of mineralogical problems through the application of condensed matter physics. In reality, mineral physicists use not only physics, but also solid-state chemistry; they study not only minerals, but all materials related to natural minerals (e.g., structural analogs, but also glasses, melts and fluids). Mineral and rock physics is intimately connected to many other geoscience disciplines including seismology, planetary science, petrology, geochemistry, geomagnetism, and geodynamics, and even materials and climate science. This book is dedicated to Orson Anderson who died in

June 2019 at the age of 94.

In this Special Issue, recent advances in cross-coupling reactions are presented in the form of original research articles, reviews, and short communications. These contributions cover different topics in this area, including novel coupling reactions, reaction conditions, synthetic alternatives, metal ligands, and applications for new pharmaceutical compounds and organic materials. In particular, the reviews deal with methodologies such as the synthesis of diarylketones through palladium catalysis and the most relevant examples of Suzuki–Miyaura and Buchwald–Hartwig coupling reactions in the synthesis of bioactive compounds. The synthetic utility of cross-coupling reactions for the synthesis of medium-size rings and the utility of Stille and Suzuki coupling reactions for the synthesis of new molecular machines based on sterically hindered anthracenyl trypticenyl units are also summarized. The original research articles present the synthesis of 2-alkynylpyrrols by inverse Sonogashira coupling and the synthesis of indoles under oxidative dearomative cross-dehydrogenative conditions. The efficient combination of iridium-catalyzed C–H borylation of aryl halides with the Sonogashira coupling and a sequential iridium-catalyzed borylation of NH-free pyrroles followed by a Suzuki–Miyaura reaction are included. The synthesis of aryl propionic acids, a common structural motif in medicinal chemistry, and the synthesis of new organic dyes are also covered.

Synthesis, Characterization and Reactivity of Ylidyne and ?-Ylido Complexes Supported by Scorpionato

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1,5-Cyclooctadien ist ein organisches Molekül, das aus einem achtgliedrigen Ring mit zwei nicht konjugierten Doppelbindungen besteht. Industriell wird es durch Dimerisierung von 1,3-Butadien hergestellt. Eingesetzt wird das 1,5-Cyclooctadien in zahlreichen Reaktionen zur Synthese von anderen organischen Molekülen und zahlreicher Organometallverbindungen. Besonders COD-Platinverbindungen spielen eine wichtige Rolle. Ihr Anwendungsbereich erstreckt sich über die Katalyse hin zu den Materialwissenschaften zusätzlich zeigen sie auch interessante biologische Eigenschaften. Im ersten Teil dieser Arbeit wurden verschiedene 1-Cyclooctadienylderivate mit funktionellen Gruppen zur Darstellung von mono- und multinuklearen Metallkomplexen synthetisiert. Im zweiten Teil der Arbeit wurden die zuvor erhaltenen Strukturen in ihrer Fähigkeit der Komplexierung von Metallen untersucht. Die Eignung der Liganden in der Synthese von monometallischen und bimetallischen Platin(II)-Komplexen wurde demonstriert. Mit der erfolgreichen Synthese von Alkoxid- und Acylkomplexen konnten bisher unbekannte Substanzklassen mit interessanten Eigenschaften entdeckt werden. Einige Platinkomplexe aus dieser Arbeit wurden zusätzlich in biologischen Tests im Vergleich zur Wirkweise von Cisplatin erfolgreich untersucht.

This book (Special Issue) presents the geological environment, physical/chemical properties, and crystallographic data for two new minerals associated with chromitites from the Othrys ophiolite complex:

Eliopoulosite, V7S8/IMA2019-96, and Grammatikopoulosite, NiVP/IMA2019-090. The distribution, mineralogy, and field relationships of PGE-enriched ores, which are important for our understanding of the metallogenic controls on the concentration of PGE and their exploration, are addressed in papers, providing (a) the first detailed data on the chromitites and platinum-group elements (PGE) mineralization from Ulan-Sar'dag ophiolite, Central Asian Fold Belt/East Sayan, Russia, (b) peculiarities on the distribution of PGE in arsenopyrites and pyrites from the Natalkinskoe gold ore deposit, NE Russia, and (c) the occurrence of zoned laurite found in the Merensky Reef of the Bushveld layered intrusion, South Africa, characterized by textural/compositional features suggesting "hydrothermal" origin. Two papers deal with (a) the rare earth element (REE) distribution in various mineral deposits of Sweden, obtained during the EURARE project, and their application to the exploration of REE and (b) the optimization of the beneficiation process for the REE recovery from black sands. Five papers provide new data of genetic and exploration significance on trace elements, including REE and PGE in various ore-types, and factors controlling the Cr stable isotope (?53Cr values) in chromitites from the Balkan peninsula.

Zeitschrift für Kristallographie. Supplement Volume 32 presents the complete Abstracts of all contributions to the 20th Annual Conference of the German Crystallographic Society in Munich 2012: -Plenary Talks -Microsymposia -Poster Session Supplement Series of Zeitschrift für Kristallographie publishes Proceedings and

Abstracts of international conferences on the interdisciplinary field of crystallography.

Based on interviews with successful biotech entrepreneurs and high-level investors as well as case studies, this title provides a comprehensive overview of current trends in biotech funding. In particular, it illustrates the tensions between both sides based on their different backgrounds and expectations. The book outlines the various funding opportunities for the biotech industry and identifies ways for both sides to overcome their existing prejudices in order to successfully thrive in a competitive environment. A must-have for biotech entrepreneurs and investors, as well as invaluable supplementary reading for students aspiring to a career in the industry.

This book is a printed edition of the Special Issue "Suzuki–Miyaura Cross-Coupling Reaction and Potential Applications" that was published in Catalysts

The crystalline state is the most commonly used essential solid active pharmaceutical ingredient (API). The characterization of pharmaceutical crystals encompasses many scientific disciplines, but the core is crystal structure analysis, which reveals the molecular structure of essential pharmaceutical compounds. Crystal structure analysis provides important structural information related to the API's wide range of physicochemical properties, such as solubility, stability, tablet performance, color, and hygroscopicity. This book entitled “Pharmaceutical Crystals" focuses on the

relationship between crystal structure and physicochemical properties. In particular, the new crystal structure of pharmaceutical compounds involving multi-component crystals, such as co-crystals, salts, and hydrates, and polymorph crystals are reported. Such crystal structures were investigated in the latest studies that combined morphology, spectroscopic, theoretical calculation, and thermal analysis with crystallographic study. This book highlights the importance of crystal structure information in many areas of pharmaceutical science and presents current trends in the structure–property study of pharmaceutical crystals. The Guest Editors of this book hope the readers enjoy a wide variety of recent studies on Pharmaceutical Crystals.

The endocannabinoid system represents a highly complex lipid-based (neuro-) transmitter system and can be found in nearly all animals. Since the discovery of the two main cannabinoid receptors CB1 and CB2 in the early '90, intensive research reviled a substantial influence of this system on many physiological and pathophysiological processes. Direct and selective targeting of the system bears a huge potential for the development of novel therapeutic approaches, especially for the treatment of chronical pain, inflammation or other neurological disorders. Therefore, the endocannabinoid system is a promising target in

drug development. In the presented thesis, the design, syntheses and pharmacologic evaluation of substituted coumarins as potential new drug candidates as selective synthetic cannabinoids were investigated. In a combinatorial synthetic approach, several new libraries of new ligands were synthesised and subsequently pharmacological tested. Additionally, in a second project, novel reversible monoacylglycerol lipase (MAGL) inhibitors have been synthesized and pharmacologically evaluated. Thereby, several important structure-activity relationships for high potency or selectivity were found. Nearly all potencies of the developed inhibitors were determined in the nanomolar regions. This book describes unconventional noncovalent interactions and analyzes their importance for crystal growth in organic and hybrid organic–inorganic systems. Several examples illustrate how the combination of theory and experiment allows rationalizing the strength and directionality of noncovalent interactions. This book elegantly describes the results of a survey of X-ray structures of main group element compounds (M = Sn, Pb As, Sb, Bi, and Te) exhibiting intermolecular M•••Se noncovalent interactions in one of its chapters. Moreover, it provides a consistent description of noncovalent interactions, covering most groups of the periodic table. The interactions are described and discussed using their trivial names. That is, a

comprehensive and accurate description is provided for alkali, alkaline earth, regium, spodium, triel, tetrel, pnictogen, chalcogen, halogen, and aerogen bonding interactions. No other book is available covering such an extensive number of interactions and examples where these interactions are relevant. relevant.

The purpose of this volume is to show how in this area the technology, creativity and inventiveness are the basis of new and encouraging results not only in the environmental field but also in the monitoring of xenobiotics of organic and inorganic origin in complex matrices. The final objective will always be on determining the fundamental parameters of interest to set up an analytical procedure, such as precision and trueness (that together give accuracy), the limits of detection and quantification, selectivity, and especially sensitivity, or attempting to increase this

Sulfonyl ynamides are highly versatile and synthetically useful reagents. This thesis details the modular synthesis and use of sulfonyl ynamides in order to access N-heterocyclic scaffolds, such as quinolines and pyrazoles. The synthesis of a wide array of sulfonyl ynamides can be realized via copper-catalyzed amidative cross-couplings or by elimination of dichloroenamide precursors. Additionally the use of Sonogashira chemistry to further diversify terminal ynamides and the synthesis

of solid-supported ynamides was investigated. Electrophilically-activated amides can be reacted with sulfonyl ynamides in order to access highly functionalized 4-aminoquinolines. The straightforward amide activation procedure with triflic anhydride and 2-chloropyridine was found to tolerate a wide range of substrates, which allowed for the development of a library of 4-aminoquinolines with ease. Moreover, 4-aminopyrazoles can be prepared by reacting terminal sulfonyl ynamides with sydnones under copper catalysis. However, as the copper catalysts were also found to promote the degradation of the ynamides, a copper-free strain-promoted alternative was developed. An in situ prepared 3-azacyclohexyne was found to tolerate a wide array of C-4 substituted sydnones, producing a mixture of both the 3,4- and 4,3-fused pyrazoles in good yields. Additional investigations into heterocyclic methodology led to the development of highly sophisticated, non-symmetrical and axially-chiral dibenzo-1,3-diazepines, -oxazepines and -thiazepines from simple, commercially available anilines. The anilines were coupled to their corresponding reaction partners via a chloromethyl intermediate and the 7-membered ring was subsequently formed using direct arylation. Zeitschrift für Kristallographie. Supplement Volume 34 presents the complete Abstracts of all contributions to the 22nd Annual Conference of the

German Crystallographic Society in Berlin 2014.

Bicyclo[1.1.1]pentanes (BCPs) gained interest in material sciences and as non-classical bioisosteres for para-substituted benzenes, alkynes and tert-butyl groups in drug design. The synthesis of BCPs is still challenging and limits their application. Starting from the strained [1.1.1]propellane there have been many contributions using CC and CN bond formations to obtain BCPs. The CS bond formation has been rarely used and not systematically investigated. Therefore, this thesis aimed at the development of methods to obtain BCP sulfides and related structures from [1.1.1]propellane. The obtained BCP sulfides were oxidized and iminated to obtain BCP sulfoxides and sulfoximines. These modifications to tune parameters like the polarity are important for a successful application of the structural motif in drug design. The final aim of this thesis was the synthesis and application of a bench-stable BCP building block to facilitate the use in medicinal chemistry and other fields. A facile and scalable four-step route to sodium BCP sulfinate was developed to deliver the product in good yield and purity. The sulfinate was applied in the synthesis of BCP sulfones, sulfoxides, a sulfinamide and sulfonamides.

The advances in and applications of x-ray and neutron crystallography form the essence of this new edition of this classic textbook, while maintaining the overall plan of the book that has been well received in the academic community since the first edition in 1977. X-ray crystallography is a universal tool for studying molecular structure, and the complementary nature of neutron diffraction crystallography permits the location of atomic species in crystals which are not easily revealed by X-ray techniques alone, such as hydrogen atoms or other light atoms in the presence of heavier atoms. Thus, a chapter discussing the practice of

neutron diffraction techniques, with examples, broadens the scope of the text in a highly desirable way. As with previous editions, the book contains problems to illustrate the work of each chapter, and detailed solutions are provided. Mathematical procedures related to the material of the main body of the book are not discussed in detail, but are quoted where needed with references to standard mathematical texts. To address the computational aspect of crystallography, the suite of computer programs from the fourth edition has been revised and expanded. The programs enable the reader to participate fully in many of the aspects of x-ray crystallography discussed in the book. In particular, the program system XRAY* is interactive, and enables the reader to follow through, at the monitor screen, the computational techniques involved in single-crystal structure determination, albeit in two dimensions, with the data sets provided. Exercises for students can be found in the book, and solutions are available to instructors.

The present Special Issue of Symmetry is devoted to two important areas of global Riemannian geometry, namely submanifold theory and the geometry of Lie groups and homogeneous spaces. Submanifold theory originated from the classical geometry of curves and surfaces. Homogeneous spaces are manifolds that admit a transitive Lie group action, historically related to F. Klein's Erlangen Program and S. Lie's idea to use continuous symmetries in studying differential equations. In this Special Issue, we provide a collection of papers that not only reflect some of the latest advancements in both areas, but also highlight relations between them and the use of common techniques. Applications to other areas of mathematics are also considered.