Synthesis Characterization Thermal Decomposition And

LESTER BATES

Nanostructures with Tunable Properties and Diverse Applications Elsevier
This book summarizes recent advances in the fabrication methods, properties, and applications of various ceramic-filled polymer matrix composites. Surface-modification methods and chemical functionalization of the ceramic fillers are explored in detail, and the outstanding thermal and mechanical properties of polymer–ceramic composites, the modeling of some of their thermal and mechanical parameters, and their major potential applications are discussed along with detailed examples. Aimed at researchers, industry professionals, and advanced students working in materials science and engineering, this work offering a review of a vast number of references in the polymer–ceramic field, this work helps readers easily advance their research and understanding of the field.
Morphological and Chemical Characterization of Catalysts Produced Via the Thermal Decomposition of Iron Pentacarbonyl ScholarlyEditions
This book focuses on exciting new research in polymer science. The first section of the book deals with new advancements in polymer technology, which includes polymers that are responsible for progress in the field of energy, electronics, and medical sciences. It focuses on the most promising polymer nanocomposites and nanomaterials. Composites are becoming more important because they can help to improve quality of life. The second section of the book highlights this aspect of macromolecules, while the third section emphasizes biopolymers, their development, and applications.
Synthesis, Characterization and Thermal Decomposition of Hybrid and Reverse Fluorosilicones MDPI
Issues in Nanotechnology and Micotechnology: Materials and Molecular Research: 2011 Edition is a ScholarlyBrief™ that delivers timely, authoritative, comprehensive, and specialized information about Nanotechnology and Micotechnology—Materials and Molecular Research in a concise format. The editors have built Issues in Nanotechnology and Micotechnology: Materials and Molecular Research: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Nanotechnology and Micotechnology—Materials and Molecular Research in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Nanotechnology and Micotechnology: Materials and Molecular Research: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.
Novel Applications in Polymers and Waste Management Synthesis, Characterization, and Thermal Decomposition of Single Source Precursors to Nanocrystalline Binary and Ternary 13-15 MaterialsThe Synthesis, Characterization, and Thermal Decomposition of Some Polymeric Schiff BasesSynthesis, Characterization and Thermal Decomposition of Hybrid and Reverse FluorosiliconesPhD.Synthesis, Characterization and Thermal Decomposition of Hybrid and Reverse FluorosiliconesTraditional fluorosilicones contain a siloxane backbone and pendant fluorinated group leading to low temperature ductility and excellent thermal stability. However, acidic or basic

catalysts can reduce the thermal stability from a potential 350°C to 150°C. The predominant decomposition mechanism is through chain scission and it is hypothesized that preventing this will result in polymers with higher thermal stability. Three approaches were taken to prevent chain scission.Second, reverse fluorosilicone (fluorinated backbone and pendant siloxane) terpolymers of chlorotrifluoroethylene (CTFE), vinyl acetate (VAc) and methacryloxypropyl-terminated polydimethylsiloxane (PDMSMA) were synthesized in supercritical CO2 (scCO2) or by emulsion polymerization. Chain scission was prevented as initial decomposition occurred between 231 and 278°C. In both the emulsion and scCO2 cases, VAc was essential in facilitating cross-propagation between CTFE and PDMSMA and the branching was similar suggesting polymerization media does not affect polymer structure. Emulsion-based polymers had higher molar masses and thermal stability whereas comparable scCO2 polymers had higher yields and incorporated more PDMSMA.Third, a series of homo-, co-, and terpolymers of CTFE, VAc and methacryloxypropyl-terminated silsesquioxane (POSSMA) were synthesized representing the first synthesis of POSSMA containing polymers in scCO2 and demonstrating reverse fluorosilicones can be synthesized without VAc. Chain scission was prevented as initial decomposition occurred from 244 to 296°C with thermal stability increasing with CTFE content to a limit. Decomposition of the polymers was examined and mechanism elucidated. In air, the copolymers give 40 to 47 wt% char since the silsesquioxane oxidizes to SiO2 while in N 2, no residue is seen. In contrast, the terpolymers give a carbonaceous residue of approximately 20 wt% in N2. The flammability and surface properties of the polymers were examined with the terpolymers having flammability similar to p(CTFE) and surface properties comparable to p(POSSMA) giving a low-flammability, hydrophobic polymer.First, a series of hybrid fluorosilicones based on (trifluorovinyl)benzene were synthesized through condensation polymerization with initial decomposition temperatures of approximately 240°C. These were compared to similar aromatic polyethers and removal of the ether oxygen lowered the initial decomposition temperature by approximately 190°C demonstrating the importance of this oxygen to the stability of polyethers.Synthesis, Characterization, and Thermal Decomposition of [Cl2GAP(SIME3)2]2, A Potential Precursor to Gallium PhosphideCl2GaP(SiMe3)22 (1) has been prepared form the 1:1 reaction of GaCl3 with P(SiMe3)3. Thermal decomposition of 1 produces a brown powder which contains GaP, as evidenced by an X-ray powder pattern and partial elemental analysis. Compound 1 crystallizes in the monoclinic space group P21/n (14) with a - 9.754(2), b = 15.585(5), c = 9.839(2) angstrom, and Beta = 96.18(1) deg, is composed of a planar Ga-P-GA-P ring, with Ga-P bond distances of 2.378(2) and 2. 380(2) Angstrom, and contains exocyclic chlorine and SiMe3 ligands. The ring core is a slightly distorted square, with Ga-P-Ga' and P-Ga-P' bond angles of 86.41(7) and 93.59(7) deg, respectively. Additionally, H NMR confirms that 1 exhibits monomer-dimer equilibrium in solution.Synthesis and Characterization of Poly(dibromophenylene Oxide)s Through Thermal Decomposition of Various Transition Metal Complexes in Solid StateCrystal Chemistry of Zinc, Cadmium and Mercury
Emerging Mass Spectrometric Tools for Analysis of Polymers and Polymer Additives, by Nina Aminlashgari and Minna Hakkarainen. Analysis of Polymer Additives and Impurities by Liquid Chromatography/Mass Spectrometry and Capillary Electrophoresis/Mass Spectrometry, by Wolfgang Buchberger and Martin Stiftinger. Direct Insertion Probe Mass Spectrometry of Polymers, by Jale Hacaloglu Mass Spectrometric Characterization of Oligo- and Polysaccharides and Their Derivatives, by Petra Mischnick. Electrospray Ionization-Mass Spectrometry for Molecular Level Understanding of Polymer Degradation, by Minna Hakkarainen.

Nanoparticulate Materials CRC Press
Renewable Materials and Green Technology Products: Environmental and Safety Aspects looks at the design, manufacture, and use of efficient, effective, safe, and more environmentally benign chemical products and processes. It includes a broad range of application-based solutions to the development of renewable materials and green technology. The latest trends in the green synthesis and properties of CNs are presented in the first chapter of this book for generating social awareness about sustainable developments. The book goes on to highlight the naissance and progressive trail of microwave-assisted synthesis of metal oxide nanoparticles, for a clean and green technology tool. Chapters discuss green technological alternatives for the global abatement of air pollution, effective use and treatment of water and wastewater, renewable power generation from solar PV cells, carbon-based nanomaterials synthesized using green protocol for sustainable development, green technologies that help to achieve economic development without harming the environment, technical solutions to cut down the quantum of N losses, conventional processing techniques in developing the bionanocomposites as the biocatalyst, and more.

Renewable Materials and Green Technology Products CRC Press
Synthesis, Characterization, and Thermal Decomposition of Single Source Precursors to Nanocrystalline Binary and Ternary 13-15 MaterialsThe Synthesis, Characterization, and Thermal Decomposition of Some Polymeric Schiff BasesSynthesis, Characterization and Thermal Decomposition of Hybrid and Reverse Fluorosilicones

Methods for Prediction of their Performance Walter de Gruyter GmbH & Co KG
The combustion properties of organic materials are used to assess their safety specifications. This knowledge is necessary to avoid potentially disastrous fires. The experimental determination of the combustion properties of a new organic compound is laborious and sometimes even impossible. This book describes methods for the determination and prediction of the combustion properties of organic compounds, along with some examples and exercises.

Combustible Organic Materials Elsevier
This research under ARO sponsorship has been directed toward the synthesis, characterization, structural isomerization, and thermal decomposition reactions of new silicon-nitrogen-phosphorus compounds. Some of these compounds undergo smooth decomposition when heated to afford phosphazenes, oligomeric materials of general formula (NPRR')n.

Mass Spectrometry of Polymers – New Techniques CRC Press
This Special Issue deals with crystal–chemical aspects of the zinc triad elements, thereby spanning a broad range from alloys, metal–organic compounds, and ionic compounds, through to molecular species.

Springer Science & Business Media
Nanoengineered Biomaterials for Advanced Drug Delivery explores the latest advances in the applications of nanoengineered biomaterials in drug delivery systems. The book covers a wide range of biomaterials and nanotechnology techniques that have been used for the delivery of different biological molecules and drugs in the human body. It is an important resource for biomaterials scientists and engineers working in biomedicine and those wanting to learn more on how nanoengineered biomaterials are being used to enhance drug delivery for a variety of diseases. Nanoengineered biomaterials have enhanced properties that make them more effective than conventional biomaterials as both drug delivery agents, and in the creation of new drug delivery systems. As nanoengineering becomes more cost-effective, nanoengineered biomaterials have become more widely used within biomedicine. Offers an informed overview on how nanoengineering biomaterials enhance their properties for drug delivery applications Discusses the major applications of nanoengineered biomaterials for drug delivery Outlines the major challenges for successfully implementing nanoengineered biomaterials into existing drug delivery systems

Synthesis, Characterization and Application of Carbon Nanotubes and Carbon Nanofibers Woodhead Publishing
Energetic Nanomaterials: Synthesis, Characterization, and Application provides researchers in academia and industry the most novel and meaningful knowledge on nanoenergetic materials, covering the fundamental chemical aspects from synthesis to application. This valuable resource fills the current gap in book publications on nanoenergetics, the energetic nanomaterials that are applied in explosives, gun and rocket propellants, and pyrotechnic devices, which are expected to yield improved properties, such as a lower vulnerability towards shock initiation, enhanced blast, and environmentally friendly replacements of currently used materials. The current lack of a systematic and easily available book in this field has resulted in an underestimation of the input of nanoenergetic materials to modern technologies. This book is an indispensable resource for researchers in academia, industry, and research institutes dealing with the production and characterization of energetic materials all over the world. Written by high-level experts in the field of nanoenergetics Covers the hot topic of energetic nanomaterials, including nanometals and their applications in nanoexplosives Fills a gap in energetic nanomaterials book publications

Applications Elsevier
This book discusses methods for the assessment of energetic compounds through heat of detonation, detonation pressure, velocity and temperature, Gurney energy and power. The authors focus on the detonation pressure and detonation velocity of non-ideal aluminized energetic compounds. This 2nd Edition includes an updated and improved presentation of simple, reliable methods for the design, synthesis and development of novel energetic compounds.

Synthesis, Characterization, and Thermal Decomposition of [Cl2GAP(SIME3)2]2, A Potential Precursor to Gallium Phosphide Royal Society of Chemistry
PhD.

Synthesis, Characterization, and Properties Elsevier
Organic Chemistry of Explosives is the first text to bring together the essential methods and routes used for the synthesis of organic explosives in a single volume. Assuming no prior knowledge, the book discusses everything from the simplest mixed acid nitration of toluene, to the complex synthesis of highly energetic caged nitro compounds. Reviews laboratory and industrial methods, which can be used to introduce aliphatic C-nitro, aromatic C-nitro, N-nitro, and nitrate ester functionality into organic compounds Discusses the advantages and disadvantages of each synthetic method or route, with scope, limitations, substrate compatibility and other important considerations Features numerous examples in the form of text, reaction diagrams, and tables.

Energetic Compounds CRC Press
Multi-component crystalline systems or co-crystals have received tremendous attention from academia and industry alike in the past decade. Applications of co-crystals are varied and are likely to positively impact a wide range of industries dealing with molecular solids. Co-crystallization has been used to improve the properties and performance of materials from pharmaceuticals to energetic materials, as well as for separation of compounds. This book combines co-crystal applications of commercial and practical interest from diverse fields in to a single volume. It also examines effective structural design of co-crystals, and provides insights into practical synthesis and characterization techniques. Providing a useful resource for postgraduate students new to applied co-crystal research and crystal engineering, it will also be of interest to established researchers in academia or industry.

Ferrite Walter de Gruyter GmbH & Co KG
Cl2GaP(SiMe3)22 (1) has been prepared form the 1:1 reaction of GaCl3 with P(SiMe3)3. Thermal decomposition of 1 produces a brown powder which contains GaP, as evidenced by an X-ray powder pattern and partial elemental analysis. Compound 1 crystallizes in the monoclinic space group P21/n (14) with a - 9.754(2), b = 15.585(5), c = 9.839(2) angstrom, and Beta = 96.18(1) deg, is composed of a planar Ga-P-GA-P ring, with Ga-P bond distances of 2.378(2) and 2. 380(2) Angstrom, and contains exocyclic chlorine and SiMe3 ligands. The ring core is a slightly distorted square, with Ga-P-Ga' and P-Ga-P' bond angles of 86.41(7) and 93.59(7) deg, respectively. Additionally, H NMR confirms that 1 exhibits monomer-dimer equilibrium in solution.

Advances in Diverse Industrial Applications of Nanocomposites John Wiley & Sons
Nanomaterials: Synthesis, Characterization, Hazards and Safety explains the fundamental properties of nanomaterials, covering their types and classifications. The book includes methods of preparation and characterization of nanostructured materials. It explains the principles and fundamentals of nanomaterials, with information on both pure and composite-based materials with e nanostructures, outlines the latest developments and advances in nanomaterials, and highlights toxic effects and protection. This book is designed to appeal to a wide readership of academic and industrial researchers, focusing on nanotechnology and nanomaterials, sustainable chemistry, energy conversion and storage, nanotechnology, chemical engineering, environmental protection, optoelectronics, sensors, and surface and interface science. Provides information on major concepts and advances made in the areas of nanomaterials properties and nano safety Identifies the major physiochemical properties of nanomaterials Explores the toxicity of different class of nanomaterials and how they can be used safely

Environmental and Safety Aspects John Wiley & Sons
Ferrites are highly interesting high-tech materials. The book covers their classification, structure, synthesis, properties and applications. Emphasis is placed on biomedical applications, degradation of organic pollutants, high frequency applications, photocatalytic applications for wastewater remediation, solar cell applications, removal of organic dyes and drugs from aquatic systems, and the synthesis of hexagonal ferrites. Keywords: Ferrite, Spinel Ferrite Nanoparticles, Biomedical Applications, Ferrite Based Heterojunction, Photocatalytic Degradation of Organic Pollutants, Nickel-Zinc Ferrites, Spinel Ferrite Based Nanomaterials, Water Remediation, Magnetic Nano Particles, Wastewater Treatment, Piezo-Phototronic Effect, Ferrite Based Solar Cells, Aurivillius Based Ceramics, Hexagonal Ferrites.

Synthesis of Silicon-Nitrogen-Phosphorus Compounds Including a New Synthesis of Phosphazenes CRC Press
This book summarizes recent progresses in inorganic fluorine chemistry. Highlights include new aspects of inorganic fluorine chemistry, such as new synthetic methods, structures of new fluorides and oxide fluorides, their physical and chemical properties, fluoride catalysts, surface modifications of inorganic materials by fluorination process, new energy conversion materials and

industrial applications. Fluorine has quite unique properties (highest electronegativity; very small polarizability). In fact, fluorine is so reactive that it forms fluorides with all elements except with the lightest noble gases helium, neon and argon. Originally, due to its high reactivity, fluoride chemistry faced many technical difficulties and remained undeveloped for many years. Now, however, a large number of fluorine-containing materials are currently produced for practical uses on an industrial scale and their applications are rapidly extending to many fields. Syntheses and structure analyses of thermodynamically unstable high-oxidation-state fluorides have greatly contributed to inorganic chemistry in this decade. Fluoride catalysts and surface modifications using fluorine are developing a new field of fluorine chemistry and will enable new syntheses of various compounds. The research on inorganic fluorides is now contributing to many chemical energy conversion processes such as lithium batteries. Furthermore, new theoretical approaches to determining the electronic structures of fluorine compounds are also progressing. On the industrial front, the use of inorganic fluorine compounds is constantly increasing, for example, in semi-conductor industry. "Advanced Inorganic Fluorides: Synthesis, Characterization and Applications" focuses on these new features in inorganic fluorine chemistry and its industrial applications. The authors are outstanding experts in their fields, and the contents of the book should prove to be of valuable assistance to all chemists, graduates, students and researchers in the field of fluorine chemistry.

Co-crystals Elsevier

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Well aligned wall carbon nanotubes (MWCNTs), carbon nanofibers (CNFs) and other type of carbon nanostructures materials have been synthesized by a fabricated floating catalyst chemical vapor deposition (FC-CVD) method. This involved the pyrolysis of benzen-ferrocene vapor mixture. The CVD parameters (Hydrogen flow rate, reaction time and reaction temperature) were studied to selectively synthesize nanotubes and nanofibers with required dimensions. Carbon nanotubes films with a diameter of 2-50 nm and nanofiber with a diameter range from 100-300 nm were synthesized in a benzene/hydrogen atmosphere. Furthermore vapor grown carbon fibers have been synthesized with different diameters and lengths. Iron clusters that were produced from the thermal decomposition of ferrocene films were used as caralyst for the synthesis of the carbon structures. The effects of different hydrogen flow rates (50-500 ml/min) on the morphology, quality and quantity of the product were investigated. Maximum yield and purity was obtained at 300 ml/min. The effect of the reaction time on the purity and yield of carbon nanotubes was studied from 1 minutes to 60 minutes. There was no effect of the reaction time on the average diameter while maximum yield of carbon nanotubes was achieved at 45 minutes. The last variables was the reaction temperature, which was varied from 500 oC to 1200 oC. By controlling the growth temperature, carbon nanotubes (CNTs), carbon nanofibers (CNFs) and vapor grown carbon fiber with different structures were produced. Increasing the temperature has a remarkable effect on the size and shape of the catalyst and this in turn affected the diameter distribution and structure of the carbon materials. The carbon nanotubes were produced from 600 oC to 850 oC with maximum yield at 850 oC, while for the production of carbon nanofibers the reaction temperature was from 900 oC to 1000 oC with a maximum yield at 1000 oC. Vapor grown carbon fibers were produced at 1050 oC to 1200 oC with maximum yield at 1050 oC. The synthesized nanotubes/nanofibers were invertigated by scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The thermal degradation kinetics of CNTs was investigated by dynamic thermogravity, in an air atmosphere, over the temperature range 25-800 oC and at constant nominal heating rate 10 oC/min. The correcponding activation energies, frequency factors and reaction orders were determined. Homogenous distribution of MWCNTs/CNFs in natural rubber (NR) was achieved by ultraconic assisted solution-evaporating method. Addition of 1-10 wt% of CNFs and CNTs to natural rubber as nanocomposite increased the rubber mechanical properties significantly. The properties of the composites such as tensile strength, tensile modulus, and elongation at break were studied. In addition to mechanical testing, the dispersion state of the MWNTs into NR was studied by TEM in order to understand the morphology of the resulting system. The result indicate that, by increasing the amount of CNTs and CNFs into natural rubber the ductility decreased and the material become stronger and tougher but at the same time more brittle. The results showed that by adding 1 wt% of CNTs and CNFs to NR the stress level increased sharply to 0.56413 to 0.54 Mpa respectively compared to NR which was 0.2839 MPa. At 10 wt% the stress level of CNTs with NR were increased sharply 9 times and reached to 2.55 MPa while for CNFs it increased 4.66 times and reached to 1.33 MPa.