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KEY=SYNTHESIS - HUFFMAN JEFFERSON

Synthesis, Modelling and Characterization of 2D Materials and their Heterostructures Elsevier Synthesis, Modelling and Characterization of 2D Materials and Their Heterostructures provides a detailed discussion on the multiscale computational approach surrounding atomic, molecular and atomic-informed continuum models. In addition to a detailed theoretical description, this book provides example problems, sample code/script, and a discussion on how theoretical analysis provides insight into optimal experimental design. Furthermore, the book addresses the growth mechanism of these 2D materials, the formation of defects, and different lattice mismatch and interlayer interactions. Sections cover direct band gap, Raman scattering, extraordinary strong light matter interaction, layer dependent photoluminescence, and other physical properties. Explains multiscale computational techniques, from atomic to continuum scale, covering different time and length scales Provides fundamental theoretical insights, example problems, sample code and exercise problems Outlines

major characterization and synthesis methods for different types of 2D materials Design of Heterogeneous Catalysts New Approaches based on Synthesis, Characterization and Modeling John Wiley & Sons This long-awaited reference source is the first book to focus on this important and hot topic. As such, it provides examples from a wide array of fields where catalyst design has been based on new insights and understanding, presenting such modern and important topics as self-assembly, nature-inspired catalysis, nano-scale architecture of surfaces and theoretical methods. With its inclusion of all the useful and powerful tools for the rational design of catalysts, this is a true "must have" book for every researcher in the field. New Approaches to Characterization and Recognition of Faces BoD – Books on Demand As a baby, one of our earliest stimuli is that of human faces. We rapidly learn to identify, characterize and eventually distinguish those who are near and dear to us. We accept face recognition later as an everyday ability. We realize the complexity of the underlying problem only when we attempt to duplicate this skill in a computer vision system. This book is arranged around a number of clustered themes covering different aspects of face recognition. The first section presents an architecture for face recognition based on Hidden Markov Models; it is followed by an article on coding methods. The next section is devoted to 3D methods of face recognition and is followed by a section covering various aspects and techniques in video. Next short section is devoted to the characterization and detection of features in faces. Finally, you can find an article on the human perception of faces and how different neurological or psychological disorders can affect this. Synthesis, Characterization and Properties of Nanostructures Computational and Experimental Approach : Special Topic Volume, Invited Papers Only Synthesis, Modelling and Characterization of 2D Materials and their Heterostructures Elsevier Synthesis, Modelling and Characterization of 2D Materials and Their Heterostructures provides a detailed discussion on the multiscale computational approach surrounding atomic, molecular and atomic-informed continuum models. In addition to a detailed theoretical description, this book provides example problems, sample code/script, and a discussion on how theoretical analysis provides insight into optimal experimental design. Furthermore, the book addresses the growth mechanism of these 2D materials, the formation of defects, and different lattice mismatch and interlayer interactions. Sections cover direct band gap, Raman scattering, extraordinary strong light matter interaction, layer dependent photoluminescence, and other physical properties. Explains multiscale computational techniques, from atomic to continuum scale, covering different time and length scales Provides fundamental theoretical insights, example problems, sample code and exercise problems Outlines major characterization and synthesis methods for different types of 2D materials Remote Sensing and GIS for Site Characterization Applications and Standards ASTM International Contains selected papers from the title international symposium, held in January

1994 in San Francisco, CA. Sections on remote sensing applications, geographic information system (GIS), site characterization, and standards detail the latest findings in areas such as digital elevation data; Landsat T Characterization of Semiconductor Heterostructures and Nanostructures Elsevier In the last couple of decades, high-performance electronic and optoelectronic devices based on semiconductor heterostructures have been required to obtain increasingly strict and well-defined performances, needing a detailed control, at the atomic level, of the structural composition of the buried interfaces. This goal has been achieved by an improvement of the epitaxial growth techniques and by the parallel use of increasingly sophisticated characterization techniques and of refined theoretical models based on ab initio approaches. This book deals with description of both characterization techniques and theoretical models needed to understand and predict the structural and electronic properties of semiconductor heterostructures and nanostructures. - Comprehensive collection of the most powerful characterization techniques for semiconductor heterostructures and nanostructures - Most of the chapters are authored by scientists that are among the top 10 worldwide in publication ranking of the specific field - Each chapter starts with a didactic introduction on the technique - The second part of each chapter deals with a selection of top examples highlighting the power of the specific technique to analyze the properties of semiconductors Synthesis, Characterization and Properties of Nanostructures Special Topic Volume, Invited Papers Only Reducing the dimensions of contiguous matter, down to the nanometer scale, confines the electronic and vibrational wavefunctions and results in unique properties which open up a wide vista of potential applications in optics, mechanics, electrical engineering, magnetic devices, catalysis and biomedicine. Nanostructures, characterized by having at least one dimension in the nanometer range, are considered to be a bridge between single molecules and their bulk counterparts. The challenge for nanotechnology is to achieve perfect control of the nanoscale-related properties; which obviously requires correlating the parameters of synthesis with the resultant nanostructures. Nanostructures are also ideal subjects for computer simulation and modeling: in computations related to nanomaterials, one deals with a spatial scaling ranging from a few nanometers to a few micrometers and a time-scaling ranging from a few femto-seconds (fs) to 1 second - with a limit of accuracy better than 1 kcal mol-1. This special-topic volume describes the novel computational and experimental approaches developed in order to resolve questions concerning the growth of nanostructures, their characterization and modeling. Motivated by the increasing need to synthesize and understand the properties of materials at the nanoscale, this issue is very timely and is an important step towards improving the knowledge of how nanomaterials can be made ever more useful to modern technologies. The book, divided into sections on Computational Nanomaterials and Experimental Nanomaterials, comprises a collection of

ten original review/papers covering experimental approaches, theoretical analysis and numerical models. Seven papers are devoted to the growth and characterization of nanomaterials, while the other three deal with theoretical approaches to understanding their properties. Another attractive feature of the book is the common aim of these papers of achieving a deeper understanding of the underlying functionality of the properties of nanomaterials. Materials Science & Engineering Biomimetic and supramolecular systems. C Resource-Based and Evolutionary Theories of the Firm Towards a Shynthesis Springer Science & Business Media A look at the field of strategic management, exploring the theories of the running of the firm. Synthesis, Characterization, and Modelling of Nano-sized Structures Nova Publishers This volume covers variety of aspects related to nanotechnology: synthesis, characterization, modelling, and few practical applications. Synthetic methods summarized in this volume are: iodine transport (Bogdanov), laser ablation (Davydov), wet chemistry methods (Alexandrova, Maximov). Electrochemical methods are the technology of choice to develop oxide structures (Levine), and electrochemical impedance spectroscopy was utilized as an electrochemical characterization method while impedance spectroscopy as a dielectric characterization method was applied by Zviagin. Oxides were also extensively studied by Maximov and Ezhovsky. Efforts in modelling by computer simulation were performed for dendronized polymers by Mikhailov and Darinsky and lizine dendrimers by Neelov. Star brushed structures were analyzed by a simple direct walk model by Polotsky. Quantum phenomena is always a focus in studies of smart nano-objects. Emphasis on this is presented by Meleshenko. Traditionally, medical applications have been the driving force for research in nanocomposites. Cancer-treating effects of some transition metal Shiff bases were reported by Yussef. Graphene Oxide in Environmental Remediation Process Springer This book discusses the remediation process using graphene oxide as removal agent from a chemical point of view. State of the art, properties of graphene oxide and its preparation methods are reported in the introduction. Environmental issues and regulations are presented in view of applying graphene oxide dispersion to the purification of aqueous medium, especially for industrial wastewater. The remediation process, for removal organic molecules, inorganic/metallic ions, covers the last part of the book. Future prospective for graphene oxide in the environmental remediation approach is commented. Characterization, Modeling, Monitoring, and Remediation of Fractured Rock National Academies Press Fractured rock is the host or foundation for innumerable engineered structures related to energy, water, waste, and transportation. Characterizing, modeling, and monitoring fractured rock sites is critical to the functioning of those infrastructure, as well as to optimizing resource recovery and contaminant management. Characterization, Modeling, Monitoring, and Remediation of Fractured Rock examines the state of practice and state of art in the characterization of fractured rock and the

chemical and biological processes related to subsurface contaminant fate and transport. This report examines new developments, knowledge, and approaches to engineering at fractured rock sites since the publication of the 1996 National Research Council report Rock Fractures and Fluid Flow: Contemporary Understanding and Fluid Flow. Fundamental understanding of the physical nature of fractured rock has changed little since 1996, but many new characterization tools have been developed, and there is now greater appreciation for the importance of chemical and biological processes that can occur in the fractured rock environment. The findings of Characterization, Modeling, Monitoring, and Remediation of Fractured Rock can be applied to all types of engineered infrastructure, but especially to engineered repositories for buried or stored waste and to fractured rock sites that have been contaminated as a result of past disposal or other practices. The recommendations of this report are intended to help the practitioner, researcher, and decision maker take a more interdisciplinary approach to engineering in the fractured rock environment. This report describes how existing tools-some only recently developed-can be used to increase the accuracy and reliability of engineering design and management given the interacting forces of nature. With an interdisciplinary approach, it is possible to conceptualize and model the fractured rock environment with acceptable levels of uncertainty and reliability, and to design systems that maximize remediation and long-term performance. Better scientific understanding could inform regulations, policies, and implementation guidelines related to infrastructure development and operations. The recommendations for research and applications to enhance practice of this book make it a valuable resource for students and practitioners in this field. Low-Dimensional and Nanostructured Materials and Devices Properties, Synthesis, Characterization, Modelling and Applications Springer This book focuses on the fundamental phenomena at nanoscale. It covers synthesis, properties, characterization and computer modelling of nanomaterials, nanotechnologies, bionanotechnology, involving nanodevices. Further topics are imaging, measuring, modeling and manipulating of low dimensional matter at nanoscale. The topics covered in the book are of vital importance in a wide range of modern and emerging technologies employed or to be employed in most industries, communication, healthcare, energy, conservation , biology, medical science, food, environment, and education, and consequently have great impact on our society. Memristor Technology: Synthesis and Modeling for Sensing and Security Applications Springer This book provides readers with a single-source guide to fabricate, characterize and model memristor devices for sensing applications. The authors describe a correlated, physics-based model to simulate and predict the behavior of devices fabricated with different oxide materials, active layer thickness, and operating temperature. They discuss memristors from various perspectives, including working mechanisms, different synthesis methods, characterization

procedures, and device employment in radiation sensing and security applications. IEEE/ACM/IFIP International Conference on Hardware/Software Codesign & System Synthesis Data-Based Methods for Materials Design and Discovery Basic Ideas and General Methods Springer Nature Machine learning methods are changing the way we design and discover new materials. This book provides an overview of approaches successfully used in addressing materials problems (alloys, ferroelectrics, dielectrics) with a focus on probabilistic methods, such as Gaussian processes, to accurately estimate density functions. The authors, who have extensive experience in this interdisciplinary field, discuss generalizations where more than one competing material property is involved or data with differing degrees of precision/costs or fidelity/expense needs to be considered. Fabrication and Application of Nanomaterials McGraw Hill Professional Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. Nanomaterials principles, practices, and fabrication methods This advanced textbook offers comprehensive coverage of nanomaterials synthesis, characterization, and functionalization using solution-based approaches. Written from a chemical engineering perspective, Fabrication and Application of Nanomaterials illustrates each topic through concise theory, numerical problems, and recent case studies. Students, scientists, and engineers studying nanotechnology and the application of nanomaterials should find the text a highly useful reference. Coverage includes:•An introduction to nanomaterials•Nucleation, growth, and synthesis of metal nanoparticles•Functionalization of metal nanoparticles•Synthesis of polymer-based nanoparticles•Functionalization and properties of hydrogels•Characterization of metal nanoparticles•Applications in•Catalysis•Drug delivery and biomedicine •Water treatment and water management •Energy harvesting Synthesis and Characterization of Fe and Cu Complexes Containing Polyimidazole Ligands Synthetic Analogue Approach to Modeling Metalloprotein Active Sites Methods in Systems Biology Academic Press Systems biology is a term used to describe a number of trends in bioscience research and a movement that draws on those trends. This volume in the Methods in Enzymology series comprehensively covers the methods in systems biology. With an international board of authors, this volume is split into sections that cover subjects such as machines for systems biology, protein production and quantification for systems biology, and enzymatic assays in systems biology research. This volume in the Methods in Enzymology series comprehensively covers the methods in systems biology With an international board of authors, this volume is split into sections that cover subjects such as machines for systems biology, protein production and quantification for systems biology, and enzymatic assays in systems biology research Fused Deposition Modeling Based 3D Printing Springer Nature This book covers 3D printing activities by fused deposition

modeling process. The two introductory chapters discuss the principle, types of machines and raw materials, process parameters, defects, design variations and simulation methods. Six chapters are devoted to experimental work related to process improvement, mechanical testing and characterization of the process, followed by three chapters on post-processing of 3D printed components and two chapters addressing sustainability concerns. Seven chapters discuss various applications including composites, external medical devices, drug delivery system, orthotic inserts, watertight components and 4D printing using FDM process. Finally, six chapters are dedicated to the study on modeling and optimization of FDM process using computational models, evolutionary algorithms, machine learning, metaheuristic approaches and optimization of layout and tool path. Microbial Nanotechnology: Green Synthesis and Applications Springer Nature This book introduces the principles and mechanisms of the biological synthesis of nanoparticles from microorganisms, including bacteria, fungi, viruses, algae, and protozoans. It presents optimization processes for synthesis of microbes-mediated nanoparticles. The book also reviews the industrial and agricultural applications of microbially-synthesized nanoparticles. It also presents the medical applications of green nanoparticles, such as treating multidrug-resistant pathogens and cancer treatment. Further, it examines the advantages and prospects for the synthesis of nanoparticles by microorganisms. Lastly, it also presents the utilization of microbial-synthesized nanoparticles in the bioremediation of heavy metals. Current Trends in Knowledge Acquisition IOS Press Knowledge acquisition has become a major area of artificial intelligence and cognitive science research. The papers in this book show that the area of knowledge acquisition for knowledge-based systems is still a diverse field in which a large number of research topics are being addressed. However, several main themes run through the papers. First, the issues of integrating knowledge from different sources and K.A. tools is a salient topic in many papers. A second major topic in the papers is that of knowledge modelling. Research in knowledge-based systems emphasises the use of generic models of reasoning and its underlying knowledge. An important trend in the area of knowledge modelling aims at the formalisation of knowledge models. Where the field of knowledge acquisition was without tools and techniques years ago, now there is a rapidly growing body of techniques and tools. Apart from the integrated workbenches already mentioned above, several papers in this book present new tools. Although knowledge acquisition and machine learning have been considered as separate subfields of AI, there is a tendency for the two fields to come together. This publication combines machine learning techniques with more conventional knowledge elicitation techniques. A framework is presented in which reasoning, problem solving and learning together form a knowledge intensive system that can acquire knowledge from its own experience. Nanofluids Science and Technology John Wiley & Sons Introduction to

nanofluids--their properties, synthesis, characterization, and applications Nanofluids are attracting a great deal of interest with their enormous potential to provide enhanced performance properties, particularly with respect to heat transfer. In response, this text takes you on a complete journey into the science and technology of nanofluids. The authors cover both the chemical and physical methods for synthesizing nanofluids, explaining the techniques for creating a stable suspension of nanoparticles. You get an overview of the existing models and experimental techniques used in studying nanofluids, alongside discussions of the challenges and problems associated with some of these models. Next, the authors set forth and explain the heat transfer applications of nanofluids, including microelectronics, fuel cells, and hybrid-powered engines. You also get an introduction to possible future applications in large-scale cooling and biomedicine. This book is the work of leading pioneers in the field, one of whom holds the first U.S. patent for nanofluids. They have combined their own first-hand knowledge with a thorough review of theliterature. Among the key topics are: * Synthesis of nanofluids, including dispersion techniques and characterization methods * Thermal conductivity and thermo-physical properties * Theoretical models and experimental techniques * Heat transfer applications in microelectronics, fuel cells, and vehicle engines This text is written for researchers in any branch of science and technology, without any prerequisite.It therefore includes some basic information describing conduction, convection, and boiling of nanofluids for those readers who may not have adequate background in these areas. Regardless of your background, you'll learn to develop nanofluids not only as coolants, but also for a host ofnew applications on the horizon. Modelling and Design of Nanostructured Optoelectronic Devices Solar Cells and Photodetectors Springer Nature This book approaches the design of functionally superior optoelectronic devices through the use of bio-inspired nanostructures and multiscale material structures through a step-by-step approach. The book combines both the fundamental theoretical concepts involved in understanding and numerically modelling optoelectronic devices and the application of such methods in addressing challenging research problems in nanostructured optoelectronic design and fabrication. The book offers comprehensive content in optoelectronic materials and engineering and can be used as a reference material by researchers in nanostructured optoelectronic design. Catalog of Federal Domestic Assistance Identifies and describes specific government assistance opportunities such as loans, grants, counseling, and procurement contracts available under many agencies and programs. Synthesis and Characterization of Transition Metal Clusters From the Isolation of Ligand-stabilized Solid Fragments to the Tuning of Magnetic Anisotropy and Host-guest Selectivity and Approaches to Science Teaching ; Development of an Observation Instrument with a Measurement Model Based on Item Response Theory Integrated Circuit and System Design: Power and Timing Modeling, Optimization and Simulation

19th International Workshop, PATMOS 2009, Delft, The Netherlands, September 9-11, 2009, Revised Selected Papers Springer Science & Business Media Welcome to the proceedings of the 19th International Workshop on Power and TimingModeling, OptimizationandSimulation, PATMOS2009.Overtheyears, PATMOShasevolvedintoanimportantEuropeanevent, whereresearchersfrom both industry and academia discuss and investigate the emerging challenges in future and contemporary applications, design methodologies, and tools required for the development of the upcoming generations of integrated circuits and s- tems. PATMOS 2009 was organized by TU Delft, The Netherlands, with sp- sorship by the NIRICT Design Lab and Cadence Design Systems, and technical co-sponsorshipbytheIEEE.Furtherinformationabouttheworkshopisavailable athttp: //ens.ewi.tudelft.nl/patmos09. The technical programof PATMOS 2009 contained state-of-the-arttechnical contributions, three invited keynotes, and a special session on SystemC-AMS Extensions. The technical program focused on timing, performance, and power consumption, as well as architectural aspects with particular emphasis on m- eling, design, characterization, analysis, and optimization in the nanometer era. The Technical Program Committee, with the assistance of additional expert reviewers, selected the 36 papers presented at PATMOS. The papers were - ganized into 7 oral sessions (with a total of 26 papers) and 2 poster sessions (with a total of 10 papers). As is customary for the PATMOS workshops, full papers were required for review, and a minimum of three reviews were received per manuscript. Machine Learning for Nonlinear Materials Characterization and Modeling Materials scientists and engineers broadly aim to study materials by analyzing their structures, performance, properties, and synthesis methods using a variety of characterization techniques. This thesis aims to develop broadly applicable data-driven techniques to advance the study of materials by improving characterization and modeling of nonlinear materials. Nonlinear materials are generally challenging to understand because of the difficulty associated with solving the relevant governing differential equations. Furthermore, many systems in materials science and engineering are governed by boundary value problems wherein certain conditions are specified at the points within or boundaries of the system. In this work, we develop two data-driven modeling approaches for boundary value problems (BVPs) involving nonlinear differential equations and one characterization technique for time-frequency analysis of a nonlinear phase evolution system. The data-driven modeling approaches can be used to understand the underlying physics, enable predictive modeling of the system, and are broadly applicable to any BVPs. The time-frequency analysis technique improves the time-frequency resolution of traditional techniques, enables analysis of nonstationary time series signals, and can be used on any multimodal nonstationary signal. Further, it is extremely useful for analyzing cantilever-based imaging modalities that are extremely common in

materials science such as atomic force microscopy. Process and Chemical Engineering Modeling, Characterization and Production of Nanomaterials Electronics, Photonics and Energy Applications Elsevier Nano-scale materials have unique electronic, optical, and chemical properties which make them attractive for a new generation of devices. Part one of Modeling, Characterization, and Production of Nanomaterials: Electronics, Photonics and Energy Applications covers modeling techniques incorporating quantum mechanical effects to simulate nanomaterials and devices, such as multiscale modeling and density functional theory. Part two describes the characterization of nanomaterials using diffraction techniques and Raman spectroscopy. Part three looks at the structure and properties of nanomaterials, including their optical properties and atomic behaviour. Part four explores nanofabrication and nanodevices, including the growth of graphene, GaN-based nanorod heterostructures and colloidal quantum dots for applications in nanophotonics and metallic nanoparticles for catalysis applications. Comprehensive coverage of the close connection between modeling and experimental methods for studying a wide range of nanomaterials and nanostructures Focus on practical applications and industry needs, supported by a solid outlining of theoretical background Draws on the expertise of leading researchers in the field of nanomaterials from around the world Polymer Nanocomposites Synthesis, Characterization, and Modeling Amer Chemical Society Research during the last ten years, spurred by the development of new analytical techniques, has led to the general recognition that aspects of the nanoscale morphology (1-100nm) are critical in the manifestation of physical properties. Nanoscale fillers, synthesis approaches, processing techniques, and morphological characterization are important facets of the polymer industry. Polymer Nanocomposites: Synthesis, Characterization, and Modeling highlights the unique chemical and physical aspects associated with polymer based nanocomposite materials. Two nonexclusive themes are present throughout the book: 1) techniques to manipulate inorganic morphology in the presence of polymers on the nanometer length scale and 2) physical understanding and implications to properties of the surface absorbed and nanoscopically confined polymers. The volume discusses the development of high performance materials as well as possible future directions for research in the field. Modeling and Prediction of Polymer Nanocomposite Properties John Wiley & Sons The book series 'Polymer Nano-, Micro- and Macrocomposites' provides complete and comprehensive information on all important aspects of polymer composite research and development, including, but not limited to synthesis, filler modification, modeling, characterization as well as application and commercialization issues. Each book focuses on a particular topic and gives a balanced in-depth overview of the respective subfi eld of polymer composite science and its relation to industrial applications. With the books the readers obtain dedicated resources with information relevant to their research, thereby helping to save time and money. This book lays the theoretical

foundations and emphasizes the close connection between theory and experiment to optimize models and real-life procedures for the various stages of polymer composite development. As such, it covers quantum-mechanical approaches to understand the chemical processes on an atomistic level, molecular mechanics simulations to predict the filler surface dynamics, finite element methods to investigate the macro-mechanical behavior, and thermodynamic models to assess the temperature stability. The whole is rounded off by a look at multiscale models that can simulate properties at various length and time scales in one go - and with predictive accuracy. Intelligent Sustainable Systems Proceedings of ICISS 2021 Springer Nature This book features research papers presented at the 4th International Conference on Intelligent Sustainable Systems (ICISS 2021), held at SCAD College of Engineering and Technology, Tirunelveli, Tamil Nadu, India, during February 26–27, 2021. The book discusses the latest research works that discuss the tools, methodologies, practices, and applications of sustainable systems and computational intelligence methodologies. The book is beneficial for readers from both academia and industry. The Journal of Imaging Science and Technology Innovative Applications of Mo(W)-Based Catalysts in the Petroleum and Chemical Industry: Emerging Research and Opportunities Emerging Research and Opportunities IGI Global Mo(W)-Based Catalysts have the capacity to drastically impact many different industries. Research on their most current applications is important for the success of many organizations and companies, specifically the chemical and petroleum industries. Innovative Applications of Mo(W)-Based Catalysts in the Petroleum and Chemical Industry: Emerging Research and Opportunities is an informative resource that overviews emerging methods and techniques that incorporate 2D layer Mo(W) dichalcogenides. Featuring extensive coverage on a range of subjects including 2D nanosheets, hybridization, dichacogenides, and oxide based catalysts, this is an ideal publication for academicians, students, engineers, and researchers seeking insight on the latest advancements in Mo(W)-Based catalyst applications. Synthesis, Characterization and Catalytic Testing of Palladium and Nickel Based Intermetallic Compounds for Acetylene Semi-hydrogenation Intermetallic compounds often offer opportunities for synthesis of site isolated catalysts having precise active site coordination and morphology. They are also resistant to segregation effects (compared to random alloys) because of the high heat of formation of their unique electronically stabilized crystal structures. Due to predictable, periodic and easily reproducible nature of the isolated active sites, suitably chosen intermetallic compounds can act as excellent model systems for studying catalytic structure function correlation in different small molecule chemistries. In the current dissertation I utilized H2-D2 exchange in addition to ethylene and acetylene hydrogenation as the probe reactions of choice. My ultimate target is to understand and quantify the effect of active site (transition metal) isolation during the semi-hydrogenation of acetylene in an ethylene

rich stream, which is a key step in industrial polyethylene synthesisa multi-hundred-billion-dollar industry. I studied two different classes of catalysts for this chemistry: Pd-(M)-Zn (M=Cu, Ag, Au) -brass intermetallics and Ni-Ga intermetallics. I used micron scale bulk materials as model catalysts because they provide greater compositional control and allows for studying the intrinsic catalytic property of the intermetallic, free from support and ligand effects.A significant part of the text is dedicated to the synthesis, characterization and catalytic study of the bulk Pd-(M)-Zn ternary -brass phase materials because of its unique adaptability in terms of developing a family of closely related model catalysts having Pd-M-Pd active sites (M=Pd, Zn, Au, Cu and Ag) which can change the semi-hydrogenation activity and selectivity by two orders of magnitude even when only one atom is changed per 52 atom unit cell. As an extension of this project I also report several Pd-Ni-Zn and Pd-Pt-Zn ternary -brass phases and determine their atomic site occupancy factors.During the course of my research I realized there were no reported methods for synthesizing Pd-Zn and Ni-Zn -brass intermetallics as catalytically relevant supported nano-particles (NPs). I developed and optimized a hybrid generalized synthesis approach for SiO_2 supported Pd-Zn, Ni-Zn and Cu-Zn -brass NPs. I also provide preliminary evidence that this approach can be easily extended to the synthesis of ternary NPs as well.In the case of Ni-Ga intermetallics, I tried to understand the role of Ga in controlling acetylene semi-hydrogenation. I observed a reversal in the ethylene selectivity trend with Ga content between 85 C and 160 C which is unexpected based on published DFT calculations. Previously, it has been suggested that Ga simply acts as a spacer for isolating Ni/Pd active sites much like Zn in the case of Ni-Zn catalysts (studied by Charles Spanjers from our research group). However, Ga has a higher affinity to hydrogen compared to Zn and I attempted to investigate if Ga may have a weak but non-negligible catalytic contribution towards hydrogenation which has typically not been previously considered in any detail in the case of acetylene semi-hydrogenation on metallic catalysts. Additionally, I provide understanding behind the high acetylene semi-hydrogenation selectivity of Ni5Zn21 catalyst which was originally reported by Spanjers et al. (J. Catal. 2014). This involved identifying the site occupation factor of Ni and Zn in the -brass lattice for materials having greater than 15.4 at% Ni. It is determined that (unlike Pd-Zn -brass) exactly single atom Ni1 active sites are exposed on the surface irrespective of the Ni concentration (even though Ni3 clusters are present in the bulk) which explains the suppression of over-hydrogenation and oligomerization on this catalyst, resulting in the high ethylene selectivity reported by Spanjers et al. Chemical Engineering Progress VLSI-SoC: Design Trends 28th IFIP WG 10.5/IEEE International Conference on Very Large Scale Integration, VLSI-SoC 2020, Salt Lake City, UT, USA, October 6–9, 2020, Revised and Extended Selected Papers Springer Nature This book contains extended and revised versions of the best papers presented at the 28th IFIP WG 10.5/IEEE International Conference on Very Large Scale

Integration, VLSI-SoC 2020, held in Salt Lake City, UT, USA, in October 2020.* The 16 full papers included in this volume were carefully reviewed and selected from the 38 papers (out of 74 submissions) presented at the conference. The papers discuss the latest academic and industrial results and developments as well as future trends in the field of System-on-Chip (SoC) design, considering the challenges of nano-scale, state-of-the-art and emerging manufacturing technologies. In particular they address cutting-edge research fields like low-power design of RF, analog and mixed-signal circuits, EDA tools for the synthesis and verification of heterogenous SoCs, accelerators for cryptography and deep learning and on-chip Interconnection system, reliability and testing, and integration of 3D-ICs. *The conference was held virtually. Digest of Technical Papers