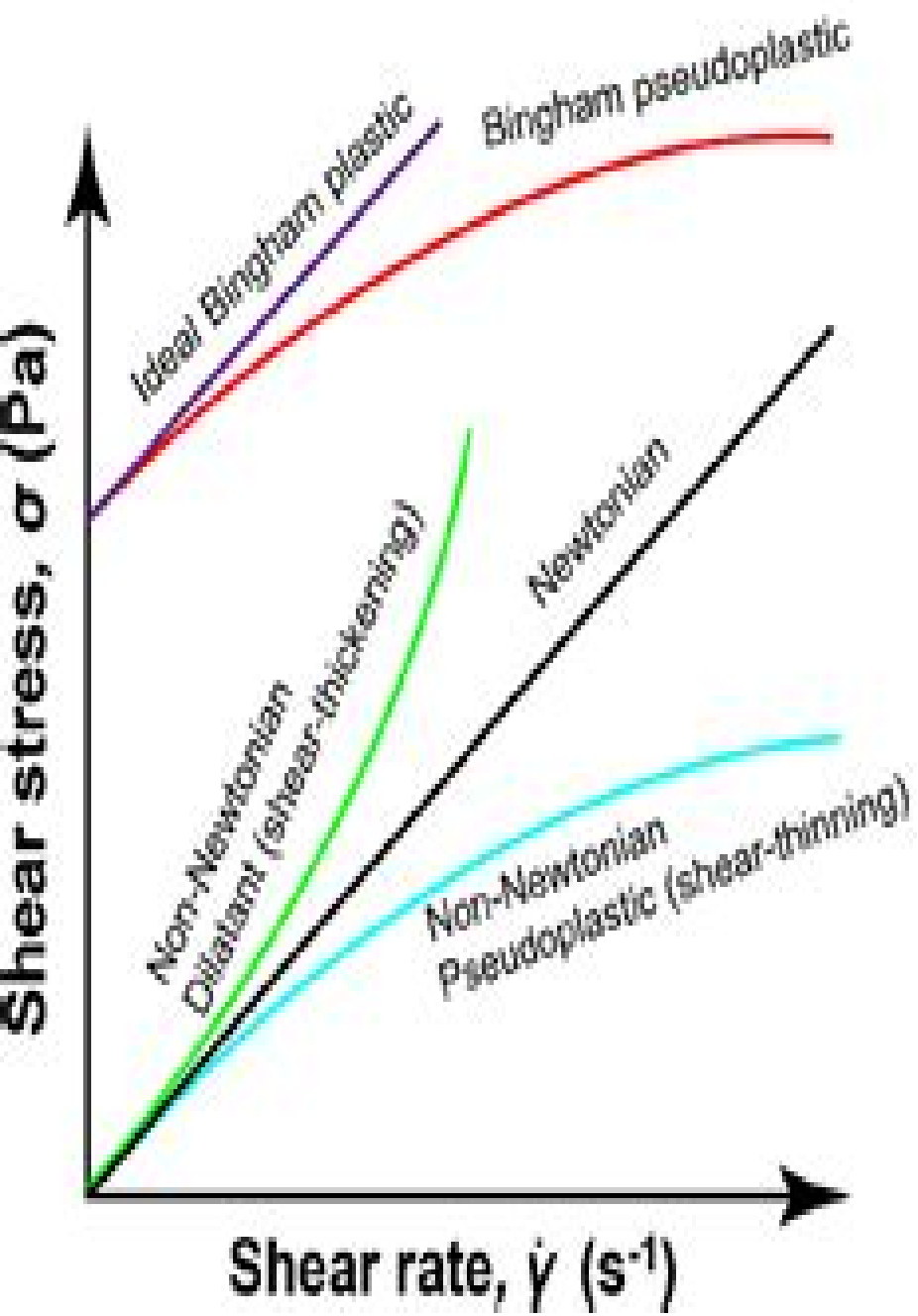
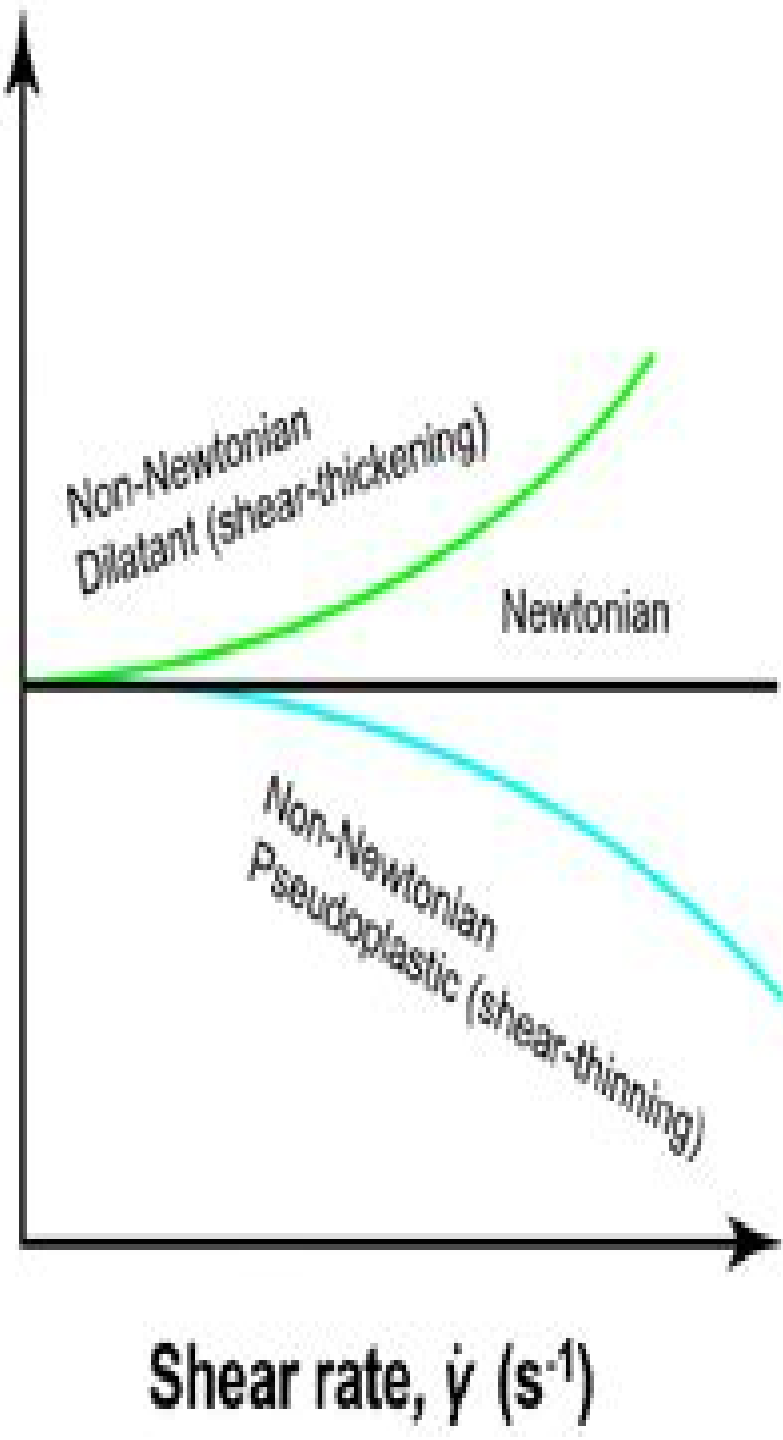


(a)



(b)

Viscosity, η (Pa.s)



Rheology Fluids 002

**Maria Teresa Cidade, João Miguel
Nóbrega**



Rheology Fluids 002:

Rheology and Non-Newtonian Fluids Fridtjov Irgens, 2013-07-25 This book gives a brief but thorough introduction to the fascinating subject of non Newtonian fluids their behavior and mechanical properties After a brief introduction of what characterizes non Newtonian fluids in Chapter 1 some phenomena characteristic of non Newtonian fluids are presented in Chapter 2 The basic equations in fluid mechanics are discussed in Chapter 3 Deformation kinematics the kinematics of shear flows viscometric flows and extensional flows are the topics in Chapter 4 Material functions characterizing the behavior of fluids in special flows are defined in Chapter 5 Generalized Newtonian fluids are the most common types of non Newtonian fluids and are the subject in Chapter 6 Some linearly viscoelastic fluid models are presented in Chapter 7 In Chapter 8 the concept of tensors is utilized and advanced fluid models are introduced The book is concluded with a variety of 26 problems Solutions to the problems are ready for instructors

Rheology Giovanni Astarita, 2013-06-29 At the VIIth International Congress on Rheology which was held in Goteborg in 1976 Proceedings were for the first time printed in advance and distributed to all participants at the time of the Congress Although of course we Italians would be foolish to even try to emulate our Swedish friends as far as efficiency of organization is concerned we decided at the very beginning that as far as the Proceedings were concerned the VIIIth International Congress on Rheology in Naples would follow the standards of time liness set by the Swedish Society of Rheology This book is the result we have obtained We wish to acknowledge the cooperation of Plenum Press in producing it within the very tight time schedule available Every four years the International Congress on Rheology represents the focal point where all rheologists meet and the state of the art is brought up to date for everybody interested the Proceedings represent the written record of these milestones of scientific progress in rheology We have tried to make use of the traditions of having invited lectures and of leaving to the organizing committee the freedom to choose the lecturers as they see fit in order to collect a group of invited lectures which gives as broad as possible a landscape of the state of the art in every relevant area of rheology The seventeen invited lectures are collected in the first volume of the proceedings

Rheology Giovanni Astarita, Giuseppe Marrucci, Luigi Nicolais, 1980

Rheology of Complex Fluids Abhijit P. Deshpande, J. Murali Krishnan, Sunil Kumar, 2010-09-20 The aim of the School on Rheology of Complex fluids is to bring together young researchers and teachers from educational and R D institutions and expose them to the basic concepts and research techniques used in the study of rheological behavior of complex fluids The lectures will be delivered by well recognized experts The book contents will be based on the lecture notes of the school

Electro-rheological Fluids, Magneto-rheological Suspensions And Their Application - Proceedings Of The 6th International Conference Kiyohito Koyama, M Nakano, 1999-01-18 Electrorheological ER fluids and magnetorheological MR suspensions show dramatic and reversible rheological changes when the electric or magnetic field is applied Over the past several years their performance and reliability have been significantly improved and their potential applications and acceptances have been widened These

fluids may make a tremendous impact on industry and technology This volume contains a total of 107 papers which are most up to date and which give probably the best information on the state of the art of the ERF MRS field It covers the fields of material technology mechanisms bridging structure and properties on ER fluids MR suspensions and ferrofluids and the fields of their applications i e damping devices clutches braking devices actuators optical devices polishing devices and so on

Computational Rheology Robert G Owens, Timothy N Phillips, 2002-05-29 Modern day high performance computers are making available to 21st century scientists solutions to rheological flow problems of ever increasing complexity Computational rheology is a fast moving subject problems which only 10 years ago were intractable such as 3D transient flows of polymeric liquids non isothermal non Newtonian flows or flows of highly elastic liquids through complex geometries are now being tackled owing to the availability of parallel computers adaptive methods and advances in constitutive modelling Computational Rheology traces the development of numerical methods for non Newtonian flows from the late 1960 s to the present day It begins with broad coverage of non Newtonian fluids including their mathematical modelling and analysis before specific computational techniques are discussed The application of these techniques to some important rheological flow problems of academic and industrial interest is then treated in a detailed and up to date exposition Finally the reader is kept abreast of topics at the cutting edge of research in computational applied mathematics such as adaptivity and stochastic partial differential equations All the topics in this book are dealt with from an elementary level and this makes the text suitable for advanced undergraduate and graduate students as well as experienced researchers from both the academic and industrial communities

Advanced Materials Ajit Behera, 2021-11-21 This book provides a thorough introduction to the essential topics in modern materials science It brings together the spectrum of materials science topics spanning inorganic and organic materials nanomaterials biomaterials and alloys within a single cohesive and comprehensive resource Synthesis and processing techniques structural and crystallographic configurations properties classifications process mechanisms applications and related numerical problems are discussed in each chapter End of chapter summaries and problems are included to deepen and reinforce the reader s comprehension Provides a cohesive and comprehensive reference on a wide range of materials and processes in modern materials science Presents material in an engaging manner to encourage innovative practices and perspectives Includes chapter summaries and problems at the end of every chapter for reinforcement of concepts

Rheology - Volume I Crispulo Gallegos, 2010-11-30 Rheology is a component of Encyclopedia of Chemical Sciences Engineering and Technology Resources in the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty Encyclopedias Rheology is the study of the flow of matter It is classified as a physics discipline and focuses on substances that do not maintain a constant viscosity or state of flow That can involve liquids soft solids and solids that are under conditions that cause them to flow It applies to substances which have a complex molecular structure such as muds sludges suspensions polymers and other glass formers as well as many foods and additives

bodily fluids and other biological materials The theme on Rheology focuses on five main areas namely basic concepts of rheology rheometry rheological materials rheological processes and theoretical rheology Of course many of the chapters contain material from more than one general area Rheology is an interdisciplinary subject which embraces many aspects of mathematics physics chemistry engineering and biology These two volumes are aimed at the following five major target audiences University and College students Educators Professional practitioners Research personnel and Policy analysts managers and decision makers and NGOs

Rheology and Processing of Polymeric Materials Chang Dae Han, 2007-05-16 Volume 1 presents first fundamental principles of the rheology of polymeric fluid including kinematics and stresses of a deformable body the continuum theory for the viscoelasticity of flexible homogeneous polymeric liquids the molecular theory for the viscoelasticity of flexible homogeneous polymeric liquids and the experimental methods for the measurement of the rheological properties of polymeric liquids The materials presented are intended to set a stage for the subsequent chapters by introducing the basic concepts and principles of rheology from both phenomenological and molecular perspectives of structurally simple flexible and homogeneous polymeric liquids Next this volume presents the rheological behavior of structurally complex polymeric materials including miscible polymer blends block copolymers liquid crystalline polymers thermoplastic polyurethanes immiscible polymer blends particulate filled polymers organoclay nanocomposites molten polymers with dissolved gas and thermostats

Smart Fluid Technologies Selim Gürgen, 2025-09-02 This book discusses the cutting edge advancements in smart fluids presenting the latest developments and applications across various industries From innovative materials like ferrofluids electro rheological fluids magneto rheological fluids photo rheological fluids electro conjugate fluids and shear thickening fluids the book offers a detailed investigation of how these smart fluids are enhancing fields including automotive aerospace and robotics This book provides a comprehensive exploration of the theoretical foundations properties and diverse applications of smart fluids It serves as an invaluable resource for engineers researchers and scientists seeking to understand and advance the field of smart fluids

Shear Thickening Fluid Selim Gürgen, 2023-03-22 Shear Thickening Fluid Theory and Applications provides a complete reference on shear thickening fluid STF and STF applications for engineers researchers and scientists STF rheology is discussed in terms of several factors including suspension medium particle size particle shape and environmental conditions Single phase STF is discussed and the novel concept of multi phase STF is examined by considering various fillers in this smart fluid Prominent applications of STF are categorized as multi functional systems adaptive damping devices surface finishing operations and protective structures and the applications are described by discussing the smart behavior of STF

Rheological Fundamentals of Polymer Processing J.A. Covas, J.F. Agassant, A.C. Diogo, J. Vlachopoulos, K. Walters, 2013-04-17 Experts in rheology and polymer processing present up to date fundamental and applied information on the rheological properties of polymers in particular those relevant to processing contributing to the physical understanding and the mathematical modelling of

polymer processing sequences Basic concepts of non Newtonian fluid mechanics micro rheological modelling and constitutive modelling are reviewed and rheological measurements are described Topics with practical relevance are debated such as linear viscoelasticity converging and diverging flows and the rheology of multiphase systems Approximation methods are discussed for the computer modelling of polymer melt flow Subsequently polymer processing technologies are studied from both simulation and engineering perspectives Mixing crystallization and reactive processing aspects are also included Audience An integrated and complete view of polymer processing and rheology important to institutions and individuals engaged in the characterisation testing compounding modification and processing of polymeric materials Can also support academic polymer processing engineering programs [Encyclopedia Of Medical Robotics, The \(In 4 Volumes\)](#) ,2018-08-28

The Encyclopedia of Medical Robotics combines contributions in four distinct areas of Medical robotics namely Minimally Invasive Surgical Robotics Micro and Nano Robotics in Medicine Image guided Surgical Procedures and Interventions and Rehabilitation Robotics The volume on Minimally Invasive Surgical Robotics focuses on robotic technologies geared towards challenges and opportunities in minimally invasive surgery and the research design implementation and clinical use of minimally invasive robotic systems The volume on Micro and Nano robotics in Medicine is dedicated to research activities in an area of emerging interdisciplinary technology that is raising new scientific challenges and promising revolutionary advancement in applications such as medicine and biology The size and range of these systems are at or below the micrometer scale and comprise assemblies of micro and nanoscale components The volume on Image guided Surgical Procedures and Interventions focuses primarily on the use of image guidance during surgical procedures and the challenges posed by various imaging environments and how they related to the design and development of robotic systems as well as their clinical applications This volume also has significant contributions from the clinical viewpoint on some of the challenges in the domain of image guided interventions Finally the volume on Rehabilitation Robotics is dedicated to the state of the art of an emerging interdisciplinary field where robotics sensors and feedback are used in novel ways to re learn improve or restore functional movements in humans Volume 1 Minimally Invasive Surgical Robotics focuses on an area of robotic applications that was established in the late 1990s after the first robotics assisted minimally invasive surgical procedure This area has since received significant attention from industry and researchers The teleoperated and ergonomic features of these robotic systems for minimally invasive surgery MIS have been able to reduce or eliminate most of the drawbacks of conventional laparoscopic MIS Robotics assisted MIS procedures have been conducted on over 3 million patients to date primarily in the areas of urology gynecology and general surgery using the FDA approved da Vinci surgical system The significant commercial and clinical success of the da Vinci system has resulted in substantial research activity in recent years to reduce invasiveness increase dexterity provide additional features such as image guidance and haptic feedback reduce size and cost increase portability and address specific clinical procedures The area of robotic MIS is therefore in a state of

rapid growth fueled by new developments in technologies such as continuum robotics smart materials sensing and actuation and haptics and teleoperation An important need arising from the incorporation of robotic technology for surgery is that of training in the appropriate use of the technology and in the assessment of acquired skills This volume covers the topics mentioned above in four sections The first section gives an overview of the evolution and current state the da Vinci system and clinical perspectives from three groups who use it on a regular basis The second focuses on the research and describes a number of new developments in surgical robotics that are likely to be the basis for the next generation of robotic MIS systems The third deals with two important aspects of surgical robotic systems teleoperation and haptics the sense of touch Technology for implementing the latter in a clinical setting is still very much at the research stage The fourth section focuses on surgical training and skills assessment necessitated by the novelty and complexity of the technologies involved and the need to provide reliable and efficient training and objective assessment in the use of robotic MIS systems In Volume 2 Micro and Nano Robotics in Medicine a brief historical overview of the field of medical nanorobotics as well as the state of the art in the field is presented in the introductory chapter It covers the various types of nanorobotic systems their applications and future directions in this field The volume is divided into three themes related to medical applications The first theme describes the main challenges of microrobotic design for propulsion in vascular media Such nanoscale robotic agents are envisioned to revolutionize medicine by enabling minimally invasive diagnostic and therapeutic procedures To be useful nanorobots must be operated in complex biological fluids and tissues which are often difficult to penetrate In this section a collection of four papers review the potential medical applications of motile nanorobots catalytic based propelling agents biologically inspired microrobots and nanoscale bacteria enabled autonomous drug delivery systems The second theme relates to the use of micro and nanorobots inside the body for drug delivery and surgical applications A collection of six chapters is presented in this segment The first chapter reviews the different robot structures for three different types of surgery namely laparoscopy catheterization and ophthalmic surgery It highlights the progress of surgical microrobotics toward intracorporeally navigated mechanisms for ultra minimally invasive interventions Then the design of different magnetic actuation platforms used in micro and nanorobotics are described An overview of magnetic actuation based control methods for microrobots with eventually biomedical applications is also covered in this segment The third theme discusses the various nanomanipulation strategies that are currently used in biomedicine for cell characterization injection fusion and engineering In vitro 3D cell culture has received increasing attention since it has been discovered to provide a better simulation environment of in vivo cell growth Nowadays the rapid progress of robotic technology paves a new path for the highly controllable and flexible 3D cell assembly One chapter in this segment discusses the applications of micro nano robotic techniques for 3D cell culture using engineering approaches Because cell fusion is important in numerous biological events and applications such as tissue regeneration and cell reprogramming a chapter on robotic tweezers cell manipulation system

to achieve precise laser induced cell fusion using optical trapping has been included in this volume Finally the segment ends with a chapter on the use of novel MEMS based characterization of micro scale tissues instead of mechanical characterization for cell lines studies Volume 3 Image guided Surgical Procedures and Interventions focuses on several aspects ranging from understanding the challenges and opportunities in this domain to imaging technologies to image guided robotic systems for clinical applications The volume includes several contributions in the area of imaging in the areas of X Ray fluoroscopy CT PET MR Imaging Ultrasound imaging and optical coherence tomography Ultrasound based diagnostics and therapeutics as well as ultrasound guided planning and navigation are also included in this volume in addition to multi modal imaging techniques and its applications to surgery and various interventions The application of multi modal imaging and fusion in the area of prostate biopsy is also covered Imaging modality compatible robotic systems sensors and actuator technologies for use in the MRI environment are also included in this work as is the development of the framework incorporating image guided modeling for surgery and intervention Finally there are several chapters in the clinical applications domain covering cochlear implant surgery neurosurgery breast biopsy prostate cancer treatment endovascular interventions neurovascular interventions robotic capsule endoscopy and MRI guided neurosurgical procedures and interventions Volume 4 Rehabilitation Robotics is dedicated to the state of the art of an emerging interdisciplinary field where robotics sensors and feedback are used in novel ways to relearn improve or restore functional movements in humans This volume attempts to cover a number of topics relevant to the field The first section addresses an important activity in our daily lives walking where the neuromuscular system orchestrates the gait posture and balance Conditions such as stroke vestibular deficits or old age impair this important activity Three chapters on robotic training gait rehabilitation and cooperative orthoses describe the current works in the field to address this issue The second section covers the significant advances in and novel designs of soft actuators and wearable systems that have emerged in the area of prosthetic lower limbs and ankles in recent years which offer potential for both rehabilitation and human augmentation These are described in two chapters The next section addresses an important emphasis in the field of medicine today that strives to bring rehabilitation out from the clinic into the home environment so that these medical aids are more readily available to users The current state of the art in this field is described in a chapter The last section focuses on rehab devices for the pediatric population Their impairments are life long and rehabilitation robotics can have an even bigger impact during their lifespan In recent years a number of new developments have been made to promote mobility socialization and rehabilitation among the very young the infants and toddlers These aspects are summarized in two chapters of this volume [Rheology for Ceramists](#) Dennis R. Dinger, 2010-11-17 This book was written to help ceramists to understand the subject of rheology as it applies to suspensions Topics discussed include viscosity and rheology fundamentals syneresis and dilatancy and their causes and effects in ceramic process systems the rheological effects of gelation flocculation and deflocculation as well as the different

types of viscometers that can be used to measure rheological properties Many practical considerations are included throughout this book The discussion in the final chapter covers the methods available to adjust and control suspension rheologies in the ceramic process environment This book will be valuable reading and a handy reference for all ceramists including students technicians engineers managers and artists who want to learn more about the rheology of suspensions

Rheology Aleksandr I[A]kovlevich Malkin, Avraam I. Isayev, 2006 There are few comprehensive books on the market on the subject of Rheology the complex science dealing with flow and deformation of matter and these are several years old At least now there is a book that explains the meaning of a science that many scientists need to use but only a few can fully grasp It does so by striking the balance between oversimplification and overload of theory in a very compelling and readable manner The authors systematic presentation enables the authors to include all components of Rheology in one volume The first four chapters of this book discuss various aspects of theoretical Rheology and by examples of many studies show how particular theory model or equation can be used in solving different problems The main emphasis is on liquids but solid materials are discussed in one full chapter as well Methods of measurement and raw data treatment are included in one large chapter which constitutes more than one quarter of the book Eight groups of methods are discussed giving many choices for experimentation and guidance on where and how to use them properly The final chapter shows how to use rheological methods in different groups of products and methods of their manufacture Usefulness of chemorheological rheokinetic measurements is also emphasized This chapter continues with examples of purposeful applications in practical matters

Biomedical Fluid Dynamics Troy Shinbrot, 2019 This is a readable and attractively presented overview of fluid flow in biological systems Examples include flow through blood vessels pulsatile flow and pattern formation The book includes popular vignettes and historical anecdotes and it offers a first principles introduction to modern mathematical methods needed to solve complex problems

Rheology and Fluid Mechanics of Nonlinear Materials, 1997 Papers presented at the ASME International Mechanical Engineering Congress and Exposition **Advances in Heat Transfer**, 1982-06-24 **Advances in Heat Transfer** Anaerobic Digester Fluid Rheology and Process Efficiency Luka

Šafarič, 2019-04-02 As the anthropogenic greenhouse gas emissions continue imposing stress on our environment it is becoming increasingly important to identify and implement new renewable technologies Biogas production through anaerobic digestion has a great potential since it links waste treatment with extraction of renewable energy enabling circular bio economies that are vital for a sustainable future For biogas to have an important role as a renewable energy carrier in society the scale of its production will need to be increased substantially New substrates need to be introduced along with raising organic loading rates of the reactors to increase the rate of biogas production This contributes to challenges in maintaining process stability thus increasing the risk for process disturbances including problems that were not commonly encountered before These difficulties may be particularly pronounced when a broad range of new largely untested substrates

are introduced leading to an increased heterogeneity of organic material entering the reactors. In the case of currently the most common reactor type the continuous stirred tank biogas reactor (CSTBR) such problems may include shifts in rheology i.e. fluid behaviour of the anaerobic digester sludge. This may lead to increased energy consumption and decreased digester mixing efficiencies which in turn may lead to inefficient biogas processes ultimately decreasing the economic and environmental viability of biogas production. Much is still unknown regarding how rheology shifts happen in biogas reactors particularly when it comes to what role the substrate plays in rheological dynamics as compared to the microbial community during varying levels of biogas process stability. This thesis elucidates the interactions between substrate type, microbial community and its metabolic activity and anaerobic sludge rheology. A number of sludge samples from mesophilic and thermophilic CSTBRs digesting a broad range of substrates was analysed for their rheology. The specific effects of individual substrate types on CSTBR sludge rheology and the resulting implications for stirring power requirements and mixing efficiency were investigated. In order to also assess to which extent the microbial metabolism affects rheology at different levels of process disturbance an experiment with a trace element induced inhibition of specific metabolic pathways under mesophilic reactor conditions was performed. This was used to identify the sequence of different interactions that occur in the reactor after the process begins to fail and to evaluate how these interactions link to changes in digester sludge rheology. Finally a case study of a disturbed thermophilic anaerobic digestion process was performed including the monitoring of the response of rheology in relation to process stability which was modified by changing trace element concentrations. The use of artificial substrate without polymeric compounds in both cases allowed for an evaluation of effects of the microbial community and its metabolic products on rheology without including the effects of complex substrates. The results showed that substrate type has a large effect on how different process parameters correlate with fluid behaviour. This was particularly apparent in the case of total solids and total volatile solids which correlated well with rheological parameters for samples from reactors digesting agricultural waste, sewage sludge, paper mill waste or food waste but not for mesophilic co-digesters. Among the different substrates investigated food waste was generally observed to lead to the highest limit viscosities i.e. apparent viscosities at high shear rates where it becomes linear and constant of the anaerobic sludge while digestion of paper mill waste and thermophilic co-digestion led to some of the lowest. No fluid type could be clearly coupled to a specific substrate but it could be observed that increased solids content could generally be associated with more complex non-Newtonian rheological behaviour. The differences in fluid characteristics between reactors corresponded to large differences in modelled stirring power requirements and mixing efficiency. The results indicated that fluids with high values of rheological parameters such as the consistency index K or yield stress σ_0 would likely require more power or an adapted stirring system to achieve complete mixing. The substrates generally contributed more to the rheology characteristics of the anaerobic sludge than microbial cells on their own. Trace element induced process disturbance initially led to the inhibition of

specific microbial groups among methanogenic archaea or their syntrophic partners which later escalated to broader inhibition of many microbial groups due to the accumulation of fermentation products. This resulted in microbial cell washout with a corresponding decrease of the contribution of the cells to anaerobic sludge rheology. A recovery of the thermophilic anaerobic digestion process was possible after the supplementation of selenium and tungsten was increased resulting in increased propionate turnover rates, growing cell densities and higher viscosity. Major shifts in the methanogenic community were observed corresponding to the level of process stability. It could be concluded based on these experiments that the specific effect of microbial cells and their activity on sludge rheology were linked to cell density which corresponded to process stability. A conceptual scheme was developed based on the studies in this thesis defining complex interactions between substrate microbial metabolism and anaerobic sludge rheology in biogas processes. The possible causes of rheology shifts are visualised and discussed.

Med anledning av att antropogena utsläpp av växthusgaser fortsätter att påverka vår miljö negativt blir det allt viktigare att identifiera och implementera nya teknologier. Biogasproduktion genom anaerob rening bidrar till att sammanlänka avfallshantering med förnybar energiomvandling samt möjliggör för cirkulära bioekonomier. Avgörande för en hållbar framtid är att biogas ska utgöra en central roll som förnybar energikälla i samhälls- och tekniska system. Nya substrat behövs introduceras samtidigt som den organiska belastningen i existerande biogasreaktorer ska minska för att säkerställa produktionshastigheten. Detta bidrar emellertid till utmaningar avseende att upprätthålla processtabilitet med risk för processtörningar inklusive nya typer av problem. Dessa svårigheter kan vara särskilt uttalade när nya i stort sett otestade substrat introduceras vilket leder till ökad heterogenitet av organiskt material till reaktorerna. I tankreaktorer med omrörning (CSTR) som i nuläget är den vanligaste rekommenderade reaktortypen kan sådana processförändringar innebära förändringar i reologiska egenskaper hos reaktortvåskor. Detta kan i sin tur leda till ökad energiförbrukning och lägre omrörningseffektivitet vilket kan försämra biogasprocessens effektivitet samt bidra till minskad ekonomisk avkastning och minskade miljövinster. Det är därför fortfarande oklart hur reologiska förändringar av reaktormaterial i biogasreaktorer särskilt med avseende på val av substrat i jämförelse med mikroorganismernas roll under varierande betingelser av processtabilitet. Denna avhandling belyser interaktioner mellan typ av substrat, mikrobiella samhällen och deras metaboliska aktivitet och reologiska egenskaper av reaktorslam. Reologisk karaktärisering av reaktortvåskor från mesofila och termofila CSTRs som representerar ett brett spektrum av substrat genomfördes. De specifika effekterna av individuella substrattyper på korresponderande reaktortvåskors reologiska egenskaper och dess implikationer för omrörning undersöktes. För att kunna bedöma i vilken utsträckning den mikrobiella metabolismen inverkar på reaktortvåskors reologi vid olika nivåer av processtörning genomfördes en fallstudie med sporelement inducerad inhibering av specifika metaboliska vägar under mesofila reaktorbetingelser. Denna studie användes för att identifiera sekvensen av olika interaktioner som uppstår i reaktorn när processtörningar uppstår och för att utvärdera hur dessa interaktioner kopplar till förändringar i slamreologi. Slutligen genomfördes en fallstudie av en

termofil biogasprocess innefattande karaktäriserings av reaktormaterialets reologi i respons till förändringar i processstabilitet orsakad av förändrade spårelementkoncentrationer. I båda dessa fallstudier möjliggjorde användningen av ett artificiellt substrat utan komplexa polymerer att mikrobiella effekter på förändringar i reologiska egenskaper kunde studeras för kopplat effekter av komplexa substrat. Resultaten visade att substrattyp har stor inverkan på hur olika processparametrar korrelerar med reologiska egenskaper. Detta var särskilt tydligt med avseende på andelen totala respektive organiska fasta ämnen vilka korrelerade väl med reologiska parametrar för reaktorerna som råttade jordbruksrester avloppsslam avfall från pappersbruk respektive matavfall men ej för reaktorerna för mesofila samrättningsanläggningar. Av de undersökta substrattyperna bidrog rening av matavfall generellt till anaerobt slam med högst uppmätta värdena för gränsviskositet dvs när viskositeten blir linjär och konstant vid kända skjuvhastigheter medan rening av avfall från pappersbruk respektive termofil samrättnings av olika substrat bidrog till de låga värdena för gränsviskositet. Ingen reologisk värdetyp kunde tydligt kopplas till en specifik substrattyp men kademi torrsubstans i reaktorerna kunde generellt associeras med komplexa icke newtonska flödesegenskaper. Skillnaderna i flödesegenskaper motsvarade stora skillnader i behov av omrörningskraft och omrörningseffektivitet. Resultaten indikerade att reaktorerna med höga reologiska värden exempelvis för konsistensindex K eller flyttgräns 0 sannolikt kräver mer energi eller ett anpassat system för effektivare omrörning. Generellt bidrog substratet mer till reologiska egenskaper än de mikrobiella cellerna på egen hand. Inducerad spårmnesbrist i genomförd reaktorförklädde i början till en höjning av specifika mikrobiella grupper inom metanogena arter och deras syntrofa partners vilket i sin tur bidrog till en bredare höjning av flera mikrobiella grupper orsakad av ackumulering av olika fermentationsprodukter. Detta resulterade i överskott av cellbiomassa vilket i sin tur minskade deras effekt på slammets reologiska egenskaper. En förändring av den termofila biogasprocessen var möjlig efter kända tillsatser av spårelementen selen och volfram vilket resulterade i snabbare omsättning av propionsyra förhöjda celldensitet och viskositet. Stora förändringar observerades samtidigt inom det metanogena samhället vilka var kopplade till olika nivåer av processstabilitet. Den specifika effekten av mikroorganismer och deras aktivitet med avseende på slammets reologiska egenskaper var kopplad till celldensitet vilket motsvarade processstabiliteten. Ett konceptuellt schema utvecklades baserat på resultat av beskrivna studier för att visualisera komplexa interaktioner mellan substrat mikrobiell metabolism och reologi av anaerobt slam i biogasprocesser. De möjliga orsakerna till reologiska förändringar visualiseras och diskuteras.

Advances in Experimental and Computational Rheology, Volume II
 Maria Teresa Cidade, João Miguel Nóbrega, 2020-11-27 Rheology defined as the science of deformation and flow of matter is a multidisciplinary scientific field covering both fundamental and applied approaches. The study of rheology includes both experimental and computational methods which are not mutually exclusive. Its practical importance embraces many processes from daily life like preparing mayonnaise or spreading an ointment or shampooing to industrial processes like polymer processing and oil extraction among several others. Practical applications include also formulations and product

development Following a successful first volume we are now launching this second volume to continue to present the latest advances in the fields of experimental and computational rheology applied to the most diverse classes of materials foods cosmetics pharmaceuticals polymers and biopolymers multiphasic systems and composites and processes

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