

# Additives and rheology of polymer processing

Andreas Thürmer and Ekaterina Troussard

SIBUR | PolyLab Webinar, 19.08.2021

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## Overview

- General Polymer Properties
- Characterization of Polymer Melts  
(Viscoelastic properties / Rheology)
- Processing Technology and Processing Window
- Extrusion Technologies
- Injection Molding
- Processing Aids

SIBUR | PolyLab Webinar - BASF Plastic Additives - 19 August 2021

Internal

**BASF**

## World major thermoplastic resins breakdown

World Capacities 2015 (Million metric ton)



# Formulation Additives By Basf

**Society of Plastics Engineers.  
Technical Conference**



## **Formulation Additives By Basf:**

Polymers for Personal Care Products and Cosmetics Xian Jun Loh, 2016-07-14 All aspects of the personal care industry will be comprehensively discussed in Polymers for Personal Care Products and Cosmetics including biological targets safety issues and the legal and regulatory aspects of this large industry There will be a broad overview of cosmetic ingredients vehicles and finished products as well as coverage of the main methodologies for microbiology safety and efficacy testing The reader will be provided with a solid background of the fundamentals of the area before being brought up to date on the future of this field along with discussion of the latest materials trends and future perspectives Written by a World renowned expert in the area the book will provide a unique look into this fast developing industry from interviews carried out with key experts in industry and academia The advantages and disadvantages of the technologies involved in the development of these materials will be highlighted providing a balanced and thorough review of the current state of the art research This book will appeal to researchers academics and students working in polymer and materials chemistry particularly those with an interest in personal care products

Smart Manufacturing Masoud Soroush, Michael Baldea, Thomas F. Edgar, 2020-08-04 Research efforts in the past decade have led to considerable advances in the concepts and methods of smart manufacturing Smart Manufacturing Applications and Case Studies includes information about the key applications of these new methods as well as practitioners accounts of real life applications and case studies Written by thought leaders in the field from around the world Smart Manufacturing Applications and Case Studies is essential reading for graduate students researchers process engineers and managers It is complemented by a companion book titled Smart Manufacturing Concepts and Methods which describes smart manufacturing methods in detail Includes examples of applications of smart manufacturing in process industries Provides a thorough overview of the subject and practical examples of applications through well researched case studies Offers insights and accounts of first hand experiences to motivate further implementations of the key concepts of smart manufacturing

**Electrorheological Fluids And Magnetorheological Suspensions - Proceedings Of The 10th International Conference On Ermr 2006** Faramarz Gordaninejad, Olivia Graeve, Alan Fuchs, David York, 2007-10-17 ERMR 2006 included invited speakers technical presentations poster presentations and a student paper competition At the conference banquet Dr David Carlson of Lord Corporation addressed the conference attendees and gave a stirring speech on the history of ER and MR fluids as well as current and future applications A unique feature of the ERMR Conferences is that they comprehensively cover issues ranging from physics to chemistry to engineering applications of ER and MR materials held in a general session to enhance the interaction between the scientists and engineers The sessions in ERMR 2006 were organized based into two Symposia a Materials and b Applications Topics covered in the Materials Symposium included mechanisms preparation and characterization of ER and MR materials Topics covered in the Applications Symposium included ER and MR devices control systems system integration and applications This structure was implemented in order to

enable interaction between attending scientists and engineers in both the Materials Symposium and the Applications Symposium and to enhance the free flow of ideas and the potential collaborative research opportunities Proceedings of the 10th International Conference on Electrorheological Fluids and Magnetorheological Suspensions Faramarz Gordaninejad, 2007 ERMR 2006 included invited speakers technical presentations poster presentations and a student paper competition At the conference banquet Dr David Carlson of Lord Corporation addressed the conference attendees and gave a stirring speech on the history of ER and MR fluids as well as current and future applications A unique feature of the ERMR Conferences is that they comprehensively cover issues ranging from physics to chemistry to engineering applications of ER and MR materials held in a general session to enhance the interaction between the scientists and engineers The sessions in ERMR 2006 were organized based into two Symposia a Materials and b Applications Topics covered in the Materials Symposium included mechanisms preparation and characterization of ER and MR materials Topics covered in the Applications Symposium included ER and MR devices control systems system integration and applications This structure was implemented in order to enable interaction between attending scientists and engineers in both the Materials Symposium and the Applications Symposium and to enhance the free flow of ideas and the potential collaborative research opportunities

Sample Chapter s Chapter 1 Transient Behavior of Electrorheological Fluids in Shear Flow 471 KB Contents The Physical Mechanism to Reduce Viscosity of Liquid Suspensions R Tao Polar Molecular Type Electrorheological Fluids K Lu et al Yield Stress in Ferrofluids H Shahnazian The Effect of Dwell Time on the Rheological Behavior of MR Fluids M Ahmadian The Methods of Measuring Shear Stress of Polar Molecule Dominated ER Fluids R Shen et al Electrosensitive Lubricants E V Korobko et al Study on Characteristics of an Electrorheological Fluid Coupling Y Meng et al On the Control of a MR Torque Transfer Device M H Elahinia et al Comparison of ERF Clutch Designs D J Ellam et al Examination of Throughflow in a Radial ERF Clutch S M Chen et al Two Layered Magnetic Fluid Sloshing in a Rectangular Container S Yoshida et al Design of the High Performance MR Brake and Its Characteristics T Kikuchi et al and other papers Readership Mechanical engineers electrical engineers physicists chemists chemical engineers and materials scientists Databook of Antiblocking, Release, and Slip Additives Anna Wypych, 2021-01-26 Databook of Antiblocking Release and Slip Additives Second Edition contains detailed information on over 300 important additives for polymers including additives that are used to minimize adhesion aid separation and enhance processing and end applications for polymers Each additive is presented with data in the following categories General Information Physical Properties Health and Safety Ecological Properties and Use and Performance Data fields covered include state odor color autoignition temperature probability of biodegradation and much more Recommendations are given for specific products processing methods and mold materials and an assessment is given for each additive s features and benefits Contains the most extensive data available on a large number of antiblocking release and slip additives for polymers Features 130 data fields for each additive that are divided into General Information Physical

Properties Health and Safety Ecological Properties and Use and Performance Includes an assessment of the benefits and properties of each additive recommended dosages and processing methods      *Databook of Rheological Additives* Anna Wypych, George Wypych, 2022-03-15 Rheological additives are commonly applied in a wide range of industries and this databook provides readers with information on over 300 organic and inorganic additives This information is presented in individual tables for each product whether commercial or generic The data are divided into five groups those being General Information Physical Properties Health and Safety Ecological Properties and Use Performance The following information is included in each section General Information name CAS EC IUPAC name common name common synonyms acronym biobased cellulose functionality charge degree of substitution empirical formula chemical structure molecular mass RTECS number chemical category product class product composition moisture content and solids content Physical Properties state odor color bulk density density specific gravity relative density boiling point melting point pour point decomposition temperature glass transition temperature refractive index vapor pressure vapor density volume resistivity relative permittivity ash content pH viscosity rheological behavior absolute viscosity surface tension hydration time solubility in solvents solubility in water the heat of combustion the heat of decomposition specific heat thermal conductivity Henry's law constant particle size and volatility Health Safety NFPA classification HMIS classification OSHA hazard class UN Risk phrases UN Safety phrases UN NA class DOT class ADR RIC class ICAO IATA class IMDG class packaging group shipping name food approvals autoignition temperature self accelerating decomposition temperature flash point TLV ACGIH NIOSH and OSHA maximum exposure concentration IDLH animal testing oral rat rabbit dermal mouse oral guinea pig dermal rat dermal rat inhalation mouse inhalation ingestion skin irritation eye irritation inhalation first aid eye skin and inhalation carcinogenicity IARC NTP OSHA ACGIH and mutagenicity Ecological Properties biological oxygen demand chemical oxygen demand theoretical oxygen demand biodegradation probability aquatic toxicity algae Rainbow trout Sheepshead minnow Fathead minnow and *Daphnia magna* and partition coefficient Use Performance manufacturer product feature recommended for polymers recommended for products outstanding properties compatibility limitations a typical reason for use processing methods the concentration used storage temperature and food approval Provides readers with information on over 300 organic and inorganic additives presented in individual tables for each product Data featured are divided into five groups General Information Physical Properties Health and Safety Ecological Properties and Use Performance Information highlighted for each additive includes name common name chemical structure state odor color boiling melting points rheological behavior OSHA hazard class ingestion skin eye irritation first aid carcinogenicity biodegradation probability manufacturer product feature recommended for polymers recommended for products outstanding properties compatibility limitations a typical reason for use processing methods storage temperature and food approval      **Pressure-Sensitive Formulation** Istvan Benedek, 2020-06-07 Growing interest in the formulation of pressure sensitive adhesives as described in

the first edition of this book Pressure Sensitive Formulation VSP 2000 required a new enlarged edition including the design of pressure sensitive adhesives as a separate volume Developments in the understanding of pressure sensitivity were necessary to use macromolecular chemistry for pressure sensitive design Such developments include polymer physics and contact mechanics Progress in coating technology especially in in line coating and synthesis opened new ways for the design of pressure sensitive adhesives and products as well Actually pressure sensitive products with and without adhesives compete requiring a broad variety of material formulations and the corresponding manufacturing technology The first volume of the book examines the theoretical aspects of pressure sensitive design based on macromolecular chemistry macromolecular physics rheology and contact mechanics The second volume describes the practical aspects of pressure sensitive design and formulation related to product application The advances in the various domains are described by specialists

**Formulation of Microbial Biopesticides** H.D. Burges, 2012-12-06 Sound formulation is a vital aspect of microbial products used to protect plants from pests and diseases and to improve plant performance Formulation of Microbial Biopesticides is an in depth treatment of this vitally important subject Written by experts and carefully edited this important title brings together a huge wealth of information for the first time within the covers of one book The book is broadly divided into five sections covering principles of formulation organisms with peroral and contact modes of action organisms with the power of search and future trends Each section contains comprehensive chapters written by internationally acknowledged experts in the areas covered the book also includes three very useful appendices cataloguing formulation additives spray application criteria and terminology This outstanding book is a vitally important reference work for anyone involved in the formulation of microbial biopesticides and should find a place on the shelves of agriculture and plant scientists microbiologists and entomologists working in academic and commercial agrochemical situations and in the libraries of all research establishments and companies where this exciting subject is researched studied or taught

Additives for Polyolefins Michael Tolinski, 2009-09-22 This book focuses on the polyolefin additives that are currently important in the plastics industry alongside new additives of increasing interest such as nanofillers and environmentally sustainable materials As much as possible each chapter emphasizes the performance of the additives in the polymer and the value each relevant additive brings to polypropylene or polyethylene Where possible similar additives are compared by capability and relative cost With major sections for each additive function this book provides a highly practical guide for engineers and scientists creating and using polyolefin compounds who will find in this book a wealth of detail and practical guidance This unique resource will enable them to make practical decisions about the use of the various additives fillers and reinforcements specific to this family of materials ABOUT THE AUTHOR Michael Tolinski is a freelance writer and a lecturer at the University of Michigan s College of Engineering He is a frequent contributor to Plastics Engineering and Manufacturing Engineering Structured to make it easy for the reader to find solutions for specific property requirements

Contains a number of short case studies about companies that have used or developed a particular additive to achieve a desired result Covers environmental resistance mechanical property enhancement appearance enhancement processing aids and other modifications of form and function *Handbook of Industrial Chemical Additives* Michael Ash,1991 Contains over 18 000 entries for chemical trademark products currently sold throughout the world *Databook of Surface Modification Additives* George Wypych,2023-02-07 Databook of Surface Modification Additives Second Edition contains data on 10 groups of additives including anti scratch and mar preventing additives additives for surface tension reduction and wetting hydrophobization additives gloss enhancement and surface matting additives additives for formation of tack free surface and tackifiers and stain inhibiting additives The information on each is divided into five sections including General Information Physical chemical Properties Health and Safety Ecological Properties and Use and Performance This data is provided for approximately 360 of the most important surface modification additives produced and used today This databook will be an extremely useful resource for engineers researchers and technicians interested in using additives to modify and improve the surface properties of materials Provides detailed up to date essential data on 10 groups of additives Covers general information physical chemical properties health and safety ecological properties and use and performance Includes recommendations for specific products applications processing methods and the concentrations used **Sustainable Value Creation in the Fine and Speciality Chemicals Industry** R. Rajagopal,2014-06-12 The global fine and speciality chemicals industry is a vital segment within the chemical value chain catering to a multitude of societal and industrial needs Regulatory sustainability and consumer forces have been constantly shaping the business fundamentals of this industry Developing value creation strategies which embed economic environmental and social sustainability components will need a comprehensive assessment of business scientific and technological challenges facing the industry Sustainable Value Creation in the Fine and Speciality Chemicals Industry assesses sustainable value creation options against the backdrop of global mega trends that are defining the present and future course of the industry It discusses innovative strategies in feedstocks R D technology manufacturing resource management and the supply chain as well as the significance of the bio based chemical economy in enabling sustainable value creation in the fine and speciality chemicals industry Topics covered include Transformation in the fine and speciality chemicals business Sustainable management evolution transitions and tools Research and technology directions Resource optimization strategies Bio based chemicals specialities and polymers Sustainable practices in the fine and speciality chemicals industry Sustainable value creation strategies Sustainable Value Creation in the Fine and Speciality Chemicals Industry presents a comprehensive overview of strategic options for sustainability management in the global fine and speciality chemicals industry It will be a valuable resource for chemists and chemical engineers involved in the design and development of economically environmentally and socially sustainable practices for the future *Understanding Additives* Bodo Müller,2019-09-11 This book covers everything about the mode of

action application and possible side effects of the most important coatings additives in a single volume presented in a textbook style It reflects the needs of practical work thus it enables the reader to rapidly gain a solid grounding in these critical yet complex constituents of all paint formulations It provides both an overview and in depth basic knowledge of the most important classes of additives The various types of damage eliminated or prevented by additives are vividly illustrated with colour photos An indispensable companion for formulators

**Lubricant Additives** Leslie R. Rudnick, 2017-07-12 This indispensable book describes lubricant additives their synthesis chemistry and mode of action All important areas of application are covered detailing which lubricants are needed for a particular application Laboratory and field performance data for each application is provided and the design of cost effective environmentally friendly technologies is fully explored This edition includes new chapters on chlorohydrocarbons foaming chemistry and physics antifoams for nonaqueous lubricants hydrogenated styrene diene viscosity modifiers alkylated aromatics and the impact of REACH and GHS on the lubricant industry

*Advances in Refining Catalysis* Deniz Uner, 2017-03-16 To meet changing market demands that have stringent emission standards and to ensure proper performance in refinery units evaluation of novel catalyst designs and results from material characterization and testing of catalysts are of crucial importance for refiners as well as for catalyst manufacturers This book highlights recent developments in the application of refinery catalysts in selected units such as fluid catalytic cracking FCC hydrogen production for hydroprocessing units hydrotreating hydrocracking and sustainable processing of biomass into biofuels

**ANTEC 2001** Society of Plastics Engineers. Technical Conference, 2001

Biofuels for Aviation Christopher Chuck, 2016-06-02 Biofuels for Aviation Feedstocks Technology and Implementation presents the issues surrounding the research and use of biofuels for aviation such as policy markets certification and performance requirements life cycle assessment and the economic and technical barriers to their full implementation Readers involved in bioenergy and aviation sectors research planning or policy making activities will benefit from this thorough overview The aviation industry's commitment to reducing GHG emissions along with increasing oil prices have sparked the need for renewable and affordable energy sources tailored to this sector's very specific needs As jet engines cannot be readily electrified turning to biofuels is the most viable option However aviation is a type of transportation for which traditional biofuels such as bioethanol and biodiesel do not fulfill key fuel requirements Therefore different solutions to this situation are being researched and tested around the globe which makes navigating this scenario particularly challenging This book guides readers through this intricate subject bringing them up to speed with its current status and future prospects both from the academic and the industry point of view Science and technology chapters delve into the technical aspects of the currently tested and the most promising technology in development as well as their respective feedstocks and the use of additives as a way of adapting them to meet certain specifications Conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch are explored and their results are assessed for current and



future viability Presents the current status of biofuels for the aviation sector including technologies that are currently in use and the most promising future technologies their production processes and viability Explains the requirements for certification and performance of aviation fuels and how that can be achieved by biofuels Explores the economic and policy issues as well as life cycle assessment a comparative techno economic analysis of promising technologies and a roadmap to the future Explores conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch *Biphasic Chemistry and The Solvent Case* Jean-Philippe Goddard,Max Malacria,Cyril Ollivier,2020-01-09 Biphasic Chemistry and The Solvent Case examines recent improvements in reaction conditions in order to affirm the role of chemistry in the sustainable field This book shows that those who work within the chemistry industry support limits for the use of toxic or flammable solvents since it reduces the purifications to simple filtrations Thanks to commercial scavengers solid phase syntheses are now available to all Fluorine biphasic catalysis enables extremely efficient catalyst recycling and has a high applicability potential at the industrial level This book also reviews the many studies that have shown that water is a solvent of choice for most synthetic reactions Particular traits can be obtained and the effects on thermodynamics make it possible to operate at lower temperatures thereby achieving energy savings Finally the great diversity of application of the reactions without solvents is illustrated **Shreir's Corrosion** ,2009-02-27 This four volume reference work builds upon the success of past editions of Elsevier s Corrosion title by Shreir Jarman and Burstein covering the range of innovations and applications that have emerged in the years since its publication Developed in partnership with experts from the Corrosion and Protection Centre at the University of Manchester Shreir s Corrosion meets the research and productivity needs of engineers consultants and researchers alike Incorporates coverage of all aspects of the corrosion phenomenon from the science behind corrosion of metallic and non metallic materials in liquids and gases to the management of corrosion in specific industries and applications Features cutting edge topics such as medical applications metal matrix composites and corrosion modeling Covers the benefits and limitations of techniques from scanning probes to electrochemical noise and impedance spectroscopy Proceedings of the Estonian Academy of Sciences, Chemistry ,2006-06

## Unveiling the Magic of Words: A Overview of "**Formulation Additives By Basf**"

In a world defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their power to kindle emotions, provoke contemplation, and ignite transformative change is really awe-inspiring. Enter the realm of "**Formulation Additives By Basf**," a mesmerizing literary masterpiece penned by a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve to the book is central themes, examine its distinctive writing style, and assess its profound impact on the souls of its readers.

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Tennessee Williams (AMANDA exits through living-room curtains. TOM is left with LAURA. He stares at her stupidly for a moment. Then he crosses to shelf holding glass menagerie. The Glass Menagerie Amanda Wingfield is a faded, tragic remnant of Southern gentility who lives in poverty in a dingy St. Louis apartment with her son, Tom, and her daughter, ... The Glass Menagerie When Amanda convinces Tom to bring home from his workplace a "gentleman caller" for Laura, the illusions that Tom, Amanda, and Laura have each created in order ... The Glass Menagerie Text Scene 1: The Wingfield apartment is in the rear of the building, one of those vast hive-like conglomerations of cellular living-units that flower as. Tennessee Williams - The Glass Menagerie (Scene 3) LEGEND ON SCREEN: 'AFTER THE FIASCO' [TOM speaks from the fire-escape landing.] TOM: After the fiasco at Rubicam's Business College, the idea of getting a ... "The Glass Menagerie," Scene One and Scene Two, by ... 41 Scene 1. 352 The Wingfield apartment is in the rear of the building, one of those vast hive-like conglomerations of cellular living-units that flower as ... Tennessee Williams - The Glass Menagerie (Scene 7) A moment after the curtain rises, the lights in both rooms flicker and go out.] JIM: Hey, there, Mr Light Bulb ! [AMANDA laughs nervously. LEGEND: 'SUSPENSION ... The Glass Menagerie: Acting Edition: Tennessee Williams A new introduction by the editor of The Tennessee Williams Annual Review, Robert Bray, reappraises the play more than half a century after it won the New York ... Engineering Mechanics Dynamics (7th Edition) ... Dynamics. Seventh Edition. J. L. Meriam. L. G. Kraige. Virginia Polytechnic Institute and State University ... This book is printed on acid-free paper. Founded in ... Engineering-mechanics-dynamics-7th-edition-solutions ... Download Meriam Kraige Engineering Mechanics Dynamics 7th Edition Solution Manual PDF file for free, Get many PDF Ebooks from our online library related ... Engineering Mechanics Dynamics 7th Edition Solution ... Fill Engineering Mechanics Dynamics 7th Edition Solution Manual Pdf, Edit online. Sign, fax and printable from PC, iPad, tablet or mobile with pdfFiller ... Engineering mechanics statics - j. l. meriam (7th edition) ... Engineering mechanics statics - j. l. meriam (7th edition) solution manual ... free-body diagrams-the most important skill needed to solve mechanics problems. Engineering Mechanics Statics 7th Edition Meriam ... Engineering Mechanics Statics 7th Edition Meriam Solutions Manual - Free download as PDF File (.pdf), Text File (.txt) or read online for free. Instructors Solution Manual, Static- Meriam and L. G. Kraige Read and Download PDF Ebook engineering mechanics statics 7th edition solution manual meriam kraige at Online Ebook Libr. 2,307 79 40KB Read more ... Meriam J.L., Kraige L.G. Engineering Mechanics Statics. ... ENGINEERING MECHANICS STATICS 7TH EDITION SOLUTION MANUAL MERIAM KRAIGE PDF · Engineering Mechanics Statics Solution Manual Meriam Kraige PDF · Meriam Instructors ... Dynamics Meriam Kraige 7th Edition? Sep 9, 2018 — Where can I download the solutions manual of Engineering Mechanics: Dynamics Meriam Kraige 7th Edition? ... Dynamics (14th ed) PDF + Instructors ... Engineering Mechanics - Dynamics, 7th Ed (J. L. Meriam ... I have the comprehensive instructor's solution manuals in an electronic format for the following textbooks. They include full solutions to all the problems ... Engineering Mechanics Dynamics (7th Edition) Sign in.