



TIM OSSWALD - UNIVERSITY OF WISCONSIN-MADISON

DEVELOPMENT OF FIBER MICROSTRUCTURE

DEVELOPMENT OF FIBER MICROSTRUCTURE DURING PROCESSING OF DISCONTINUOUS FIBER REINFORCED COMPOSITE PRODUCTS

April 18, 2024 at 11:00 AM US Eastern Daylight Time

A B S T R A C T

Discontinuous fiber-reinforced composites are a special subcategory of composite materials that are used, due to the ability to process them into parts and structures of complex shape in an automated fashion via compression and injection molding, as well as extrusion processes. Discontinuous fiber-reinforced composites commonly consist of a thermoset or thermoplastic matrix material. The deformation that arises during flow results in fiber dispersion, fiber alignment, breakage and agglomeration, affecting the fiber orientation, length and density distributions. This seminar presents techniques that can be used to measure microstructure in the finished part, as well methods developed at the Polymer Engineering Center at UW-Madison to predict fiber orientation, length and density distributions in the finished part.



TIM OSSWALD

Professor of Mechanical Engineering
Director of the Polymer Engineering Center
University of Wisconsin-Madison

B I O

Tim Osswald is a Professor of Mechanical Engineering and Director of the Polymer Engineering Center at the University of Wisconsin-Madison. Originally from Cúcuta, Colombia, he received his B.S. and M.S. in Mechanical Engineering from the South Dakota School of Mines and Technology and his Ph.D. in Mechanical Engineering at the University of Illinois at Urbana-Champaign in the field of Polymer Processing. He spent two and one half years at the Institute for Plastics Processing (IKV) in Aachen, Germany, as an Alexander von Humboldt Fellow. He received the National Science Foundation's Presidential Young Investigator Award, as well as the 2001 VDI-K Dr.-Richard-Escales-Preis. In 2006 he was named an Honorary Professor at the University of Erlangen-Nuremberg in Germany and in 2011 he was named Honorary Professor at the National University of Colombia. Professor Osswald teaches polymer and polymer composites processing and designing with polymers and polymer composites and researches in the same areas, in particular in the area of fiber orientation, fiber density and fiber length distributions. Professor Osswald has published over 300 papers, the books Materials Science of Polymers for Engineers

(Hanser, 1996, 2003, 2012), Polymer Processing Fundamentals (Hanser 1998), Injection Molding Handbook (Hanser, 2001, 2007) Compression Molding (Hanser, 2003), Polymer Processing Modeling and Simulation (Hanser 2006), International Plastics Handbook (Hanser 2006), Plastics Testing and Characterization (Hanser, 2008), Understanding Polymer Processing (2010, 2017, 2024), Polymer Rheology (Hanser 2015) and Discontinuous Fiber Reinforced Composites (2020). His books have been translated into Italian, German, Spanish, Japanese, Chinese, Korean and Russian. Professor Osswald is also the series editor of Plastics Pocket Power (Hanser, 2001), which currently includes 6 books, is the Editor of Polymer Composites, Editor for the Americas of the Journal of Polymer Engineering and the English language Editor for the Journal of Plastics Technology. Professor Osswald serves on the Scientific Advisory Board of several industries, is one of the co-founders of The Madison Group, and is part of a Commission that advises the Colombian president in the creation of a Science Ministry in Colombia.