

Mechanical Engineering Spring 2007 Seminars

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224 MEC

Polymer Melting and Mixing Mechanisms in Twin Rotor Processing Equipment

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ABSTRACT

The seminar will discuss two of the most important Elementary Steps of polymer processing – Melting and Mixing - and, in particular, as they occur in twin rotor processing equipment, such as Twin Screw Extruders. In such devices, there exist regions of rotor-to-rotor interactions, which allow for the occurrence of the very efficient, volume-wise melting mechanisms of Plastic Energy Dissipation (PED) and inter-particle Frictional Energy Dissipation (FED). Subsequently, once the processed polymer charge is partially melted, the flows created in these regions of rotor-to-rotor interactions are strongly chaotic and extensional, leading to very effective distributive and dispersive mixing in single and multi-component polymer systems. Additionally such flows enable the partially melted charge to heat up by volume-wise and rather uniform Viscous Energy Dissipation (VED). The effects of polymer *Material*, equipment *Design* and *Process* Variables will be also discussed.

BIOGRAPHY

Prof. Gogos received both his undergraduate and graduate education at Princeton University, where he studied Polymer Engineering at the Princeton Plastics Laboratory under the late Prof. Bryce Maxwell.

He joined the Chemistry and Chemical Engineering Department of Stevens in 1965. In the decade following, the late Prof. Joseph A. Biesenberger and he established the premier Polymer Engineering program at Stevens, where for more than 34 years he taught and conducted research on a wide range of Polymer Engineering.

In 1979 he co-authored with Prof. Zehev Tadmor *Principles of Polymer Processing*, published by John Wiley and Sons, New York, 1979. The book, with 2nd edition published in June 2006, has served as the standard text in the field, in both industry and the academe.

Dr. Gogos was one of the co-founders of the Polymer Processing Institute (PPI) (1982), championed by the late Prof. Luigi Z. Pollara of Stevens. PPI has been a model Industry/Academe “buffer” independent not-for-profit industrial research organization serving the polymer industry worldwide. He currently serves as Chairman of the Board of Trustees of PPI, and Member of the Technical Board. Previously he served PPI as President, Director of New Initiatives and Head of the *Polymer Mixing Study*, which was supported by as many as 19 international industrial sponsors.

In 1999, after becoming Professor Emeritus of Stevens, he was appointed Distinguished ChE Research Professor at NJIT. Here he is involved in active research in polymer processing, currently heading The ACE® large Federally-funded NJIT/PPI program.

Dr. Gogos is a Fellow of the Society of Plastics Engineers (SPE), the 1999 Recipient of the SPE Extrusion Division Distinguished Service Award, and the 2002 SPE Fred O. Conley Award for Plastics Engineering/Technology and the 2005 SPE International Award, the highest honor the Society of Plastics Engineers bestows a member annually.