PRECONFERENCE SEMINAR

(separate fee required)

Thursday, September 23

8:30 am – 11:30 am

Introduction to High-Temperature Resins and Polymer-Derived Ceramics

Part 1. Introduction to High-Temperature Resins

CARL ZWEBEN, Ph. D. / Composites Consultant

Dr. Zweben's presentation provides an overview of key high-temperature thermoset and thermoplastic resins. Characteristics are compared with traditional low-temperature polymers. Resins categories covered include: unsaturated polyester (UP), epoxy (EP), toughened epoxy, bismaleimide (BMI), toughened bismaleimide, cyanate ester (CE), phenolic, polyimide (PI), polyurethane (PU), PhenylEthylnyl Terminated Imide (PETI) and Phthalo Nitrile (PN), Polyetherketoneketone (PEKK), Polyetherimide (PEI), Polyphenylene Sulfide (PPS), Polyetheretherketone (PEEK), Polyamideimide (PAI), and PolyEther Amide (PEAR). Effects of moisture are discussed. High-temperature polymer matrix composite applications are presented.

Dr. Carl Zweben, a Fellow of ASM International and SAMPE, an Associate Fellow of the American Institute of Aeronautics and Astronautics, and a Life Member of the American Society of Civil Engineers has over 40 years of commercial and aerospace experience in composite materials technology, including structures, optical systems, mechanical systems and electronics thermal management and packaging materials.

Part 2. Introduction to Preceramic Polymers

ALEXANDER LUKACS, Ph. D. / Director of Technology, KiON Defense Technologies

Preceramic Polymers are a unique class of materials. While other polymers are valued for their special performance characteristics, the value of a preceramic polymer resides not in the performance of the polymer itself, but in the performance of its thermal decomposition products. As such, it is difficult to include preceramic polymers within the category of "high temperature polymers"; neverthless, the utility of their ceramic decomposition products in a variety of high temperature applications (>1,000 oC) can hardly be overstated. **Dr. Lukacs's** presentation provides an overview of the main categories of preceramic polymers and their applications, with an emphasis on silicon-based preceramic polymers that pyrolyze to non-oxide ceramics. Also described will be some unique situations where certain preceramic polymers are actually used as the matrix material in very high temperature-stable PMCs (> 500 ^{o}C) or in concert with high performance organic polymers to enhance their high temperature durability.

Dr. Alexander Lukacs, a member of the American Chemical Society, the American Ceramic Society, and the principal inventor for thirty four (34) U.S. Patents, has worked in the field of preceramic polymer chemistry for 27 years.