



PROGRAM & ABSTRACTS

23rd World Forum on Advanced Materials
University of Nebraska-Lincoln

Lincoln, Nebraska U.S.A.
May 11-15, 2015

Welcome to PolyChar 23
University of Nebraska-Lincoln, Lincoln, Nebraska
May 11-15, 2015

It is a pleasure to welcome you to PolyChar 23, the 23rd World Forum on Advanced Materials. The local organizing committee with the help and support of members of the PolyChar executive committee, international partners, and local supporters has arranged a program of activities that we hope you enjoy. I would like to thank all the presenters for their contribution, without which there could not be a scientific program. Particular thanks goes to the plenary speakers, the keynote speakers, and the invited speakers that have agreed to give direction to the program.

I would like to take this opportunity to thank our sponsors:

- The National Science Foundation,
- The International Union of Pure and Applied Chemistry (IUPAC),
- The IUPAC/Samsung fund,
- The John A. Woollam Company,
- The University of Nebraska-Lincoln (UNL),
- The UNL Office for Research and Economic Development,
- The UNL College of Engineering,
- The UNL Department of Mechanical & Materials Engineering,
- The City of Lincoln Convention and Visitors Bureau

Dr. **Jeff Shield**, Chair of the Department of Mechanical & Materials Engineering, and Dr. **Tim Wei**, Dean of the College of Engineering, have been kind enough to provided the needed staff, support and expertise to host this conference. Without their help it would not be possible to arrange the conference.

Special thanks goes to Dr. **Prem Paul**, Vice Chancellor for Research & Economic Development at UNL, that has been a strong supporter of the activities of the Advanced Mechanics and Materials Engineering International Laboratory (AMME-International) and the effort to bring PolyChar to UNL. He also provided substantial financial support for the conference.

Finally, special thanks goes to Mrs. **Cherie Crist** and Mrs. **Mary Ramsier**, that have worked tirelessly to arrange all the activities, and to all the students that have been helping with the conference.

I hope you enjoy the program and your visit.

Sincerely,
Mehrdad Negahban, Local Organizations Chair
PolyChar 23

Talk Number: 5 (Oral)

Time: Tuesday, May 12, 2015 11:40 AM **Session:** T2_1: CMSP (Heritage Room)

MORPHOLOGICAL, THERMAL AND ELECTRICAL PROPERTIES OF STYRENIC BLOCK COPOLYMER COMPOSITES WITH NANOCARBONS

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Styrenic block copolymers having different molecular architectures were compounded with multiwalled carbon nanotubes and nanodiamond with the objectives of preparing composites with desired electrical and thermal conductivities. Melt mixing using microcompounder followed by compression molding allowed the formation of nanocomposites with well dispersed nanofillers into the polymer matrix. The materials were characterized with different microscopic techniques, X-ray diffraction, microindentation hardness measurement, and tensile testing. It was found that the matrix with co-continuous morphology favors the formation of electrically conducting polymers. The composites showed significant improvement in mechanical properties at low filler content. The observed properties of nanocomposites will be discussed in correlation with block copolymer architecture, processing methods and observed morphology.

Keywords: block copolymer, polymer nanocomposites, electron microscopy, microhardness