

# Purdue University

## School of Materials Engineering 690 Seminar Series

**Date: Monday,  
Nov. 18, 2013**

**Time: 3:30 Refreshments  
3:45 Seminar**

**Place: ARMS 1010**



**Infinite Possibilities**

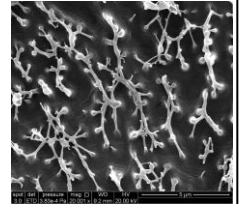
### W. H. Katie Zhong, PhD Westinghouse Distinguished Professor

School of Mechanical and Materials Engineering  
Washington State University, Pullman, Washington



#### ABSTRACT

Ultra-elastic bio-battery materials for next generation conformable electronics and power Sources: Ultra elastic and ionic conductive solid polymer electrolytes (SPEs) are a prerequisite for the development of conformable devices of next-generation electronics and high power density applications. Soy products usually have been used as rigid fillers for enhancing mechanical properties of polymers. In Dr. Zhong's lab, a rubber-like, soy protein-based SPE, was developed by controlling the denatured structure of soy protein isolate. The results indicate that the soy-SPE with 55 wt% of soy protein isolate possesses ultra-elasticity and significantly improved ionic conductivity due to the involvement of denatured soy protein.



Morphology of polymer composites with denatured soy protein

A "Nano-nectar" technology leading resins to enhanced performance and reduced viscosity for efficiently manufacturing structural composites: A nanotechnology applicable for composites industry requests: it cannot only realize stable quality for the performance enhancement, but also the composites can be manufactured more energy efficiently and compatible to the existing processing. The "nano-nectar" technology developed in Dr. Zhong's group that can be easily mixed with the base matrix can result in uniform dispersion of nano-fillers and strong interaction in the nanofillers/matrix. Studies proves the nano-nectar approach highly effective for reinforcing and toughening the matrix resins as well as contributing to reduced viscosity, which is significant to composites manufacturing energy efficiency (reduced power requirements for flow and part consolidation).

#### SHORT BIO

Dr. Katie Zhong received her Ph.D. in the Department of Materials Science and Engineering at Beijing University of Aeronautics and Astronautics (BUAA) in Beijing, China in 1994 and in 1999 became the youngest full professor at BUAA, and one of the youngest full professors in China. From 2002 to 2003, Dr. Zhong worked as a visiting scientist at Vanderbilt University. She started her associate professorship at North Dakota State University in 2003. In 2007, she joined Washington State University (WSU), in which she is currently an endowed chair professor. Dr. Zhong has served as a consultant, collaborative researcher and educator for the Boeing Company in the area of nanotechnology since 2006. Dr. Zhong has received numerous awards/honors including the SPE/Dow Chemical® Composites Educator of the Year 2011, has been selected as one of the 15 World's Best Scholars by the University of British Columbia in Canada in 2012, and in addition, Dr. Zhong was awarded the Excellent Academic Advisor at WSU in 2013, based on the success of her graduated outstanding PhD students who have received numerous global honors, including the prestigious Boeing FlightGlobal Award/Boeing Engineering Student of the Year in 2010 (2<sup>nd</sup> place) and 2012 (1<sup>st</sup> place), and the Worldwide Top 50 PhD/post-docs by MRS (2 PhD student recipients) in 2011. Dr. Zhong has over 240 publications, including 152 peer-reviewed journal papers, 6 book and book chapters, more than 80 conference papers and numerous patents.