

**DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING
SEMINAR**

University of Virginia, Charlottesville, Virginia

Multifunctional Nanotube Composites for Aerospace Vehicles

Cheol Park

National Institute of Aerospace
100 Exploration Way, Hampton VA 23666

TIME: Thursday, September 13, 2007

Place: MEC 341, Mechanical Engineering Building

Refreshments at 3:30 PM in MAE Faculty Lounge, MEC 305

Abstract:

Multifunctional structural materials can provide a novel design space for future aerospace structures. Recent studies of carbon nanotube-polymer nanocomposites indicate that these materials have the potential to provide the combination of structural integrity and sensing or actuation capability. The modulus and toughness of the polymer matrix were improved significantly with incorporation of the nanotubes. Very small loadings of single wall carbon nanotubes in a polyimide matrix result in a sensor material in response to strain, stress, pressure, and temperature. These materials also exhibit significant actuation in response to applied electric fields. This presentation will highlight how to tailor the physical properties of the multifunctional nanocomposites by controlling nanotube treatment, concentration, and degree of alignment, and discuss their potential for multifunctional structural applications.

CHEOL PARK

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EDUCATION

1991-97 Ph.D. in Macromolecular Science & Engineering, The University of Michigan

1987-89 MS in Fiber & Polymer Science Engineering, Seoul National University.

1983-87 BS in Fiber & Polymer Science Engineering, Seoul National University.

PROFESSIONAL EXPERIENCE

2005- Associate Director of NIA-BIMAT URETI program

2007- Research Fellow at NIA

2003- Senior Staff Scientist of NIA

2001-02 Senior Staff Scientist of ICASE

2000-01 Staff Scientist of ICASE

1998-00 NRC Research Associate at NASA Langley Research Center

1997-98 Postdoctoral Fellow in Materials Sci & Eng, The University of Michigan

1992-97 GSRA in Materials Science and Engineering, The University of Michigan

1989-90 Second Lieutenant in Korean Army

1987-89 Graduate Research Assistant in Textile Engineering, Seoul National University

HONORS

2007 Best Mentorship Research Site Award (VA New Horizon Governor's School)

2006 NASA Langley Certificate of Recognition for an invention disclosure entitled Mechanically strong, thermally stable, and electrically conductive nanocomposite structure and method of fabricating same

2005 NASA H. J. Reid Award 3rd Place (Best Paper Award), "Stable dispersion of single wall carbon nanotubes in polyimide: the role of noncovalent interactions"

2005 NASA Space Act Award for Development of "A Novel Surface Treatment for Titanium Alloys"

2005 NASA Langley Certificate of Recognition for an invention disclosure entitled Sensing/Actuation Materials Made from Carbon Nanotube Polymer Composites and Methods for Making Same

2005 NASA Langley Certificate of Recognition for an invention disclosure entitled Multilayer Electroactive Polymer Composite Material

2005 Certificate of Recognition for Mentorship of NASA LARSS program

2005 NASA Langley Space Act Award for Development of Electrospun Electroactive Polymers

2004 NASA Langley R&T Team Award for Carbon Nanotube Nanocomposite Development Team

2004 NASA Langley R&T Team Award for Inherently Conductive Polymers (ICP) & Piezoelectrics for Planetary Vehicles/Explores

2004 NASA Langley R&T Team Award for Advanced Polymers for the MISSE I, II, III, IV, & V

- 2004 Certificate of Recognition for Creative Development of a Technical Innovation (Organic-Inorganic Hybrid-Clay Nanocomposites)
- 2001 NASA Langley Certificate of Recognition for Disclosure of an invention entitled Surface Treatment
- 2001 NASA Langley Certificate of Recognition for Disclosure of an invention entitled Phynylethynyl-Containing Imide Silanes
- 2001 Outstanding Achievement Award for Pioneering Technical Contributions to Emerging Materials Technologies (Advanced Materials & Processing Branch, NASA Langley)
- 2000 Outstanding Achievement Award for Development of Multifunctional Nanocomposites (Advanced Materials & Processing Branch, NASA Langley)
- 2000 NASA Langley Certificate of Appreciation for Active Vibration Control in High-Speed Research Program
- 1999 NASA Langley Certificate of Appreciation for Surface Treatment in High-Speed Research Program
- 1999 Exceptional Contribution Award for Development of Novel Surface Treatment Methods for High Speed Research Program (Composites & Polymers Branch, NASA Langley)
- 1997 National Research Council Research Associateship Award
- 1996 SAMPE Outstanding Graduate Student Award
- 1996 Winner of poster contest in Michigan Chapter of SAMPE (Society for the Advancement of Material and Process Engineering)
- 1989 Korean Oversea Scholarship in Chemical Engineering