

# **Invitation** to join the planned NSF Industry & University Cooperative Research Center (I/UCRC) on **Novel High Voltage/Temperature (HV/T) Materials and Structures**

*Univ. of Denver; Univ. of Illinois at Urbana-Champaign; Michigan Technological Univ.*

## Center's Goals & Mission:

- Analyze, design and develop novel high voltage/temperature materials and structures for energy transfer, aerospace, automotive, and other applications.
- Pre-competitive research, training of graduate students, consortium of companies, university-industry collaborations, networking (electric power, aerospace, defense, automotive, manufacturing, and other industries)

## Objectives:

- Design and development of novel and evaluation of existing HV energy transmission multifunctional materials for next generation conductors, insulators, underground cables, towers ...
- Design and development of novel advanced HT materials and evaluations of existing materials for aerospace, automotive, and other industrial applications.
- Development of new multi-field failure monitoring techniques and material repair methods in HV/T materials and their subsequent transfer to the in-service inspection and repair.

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# Motivation/Needs/Significance of Planned NSF Center

## Next Generation Electric Power Industry

- New High Temperature Low Sag conductor designs
  - to transport more electrical power more efficiently
  - to reduce line sag in all-metal high-voltage conductors
- New non-ceramic insulators and underground cables
- Novel technologies for other HV/T grid structures



## Aerospace Industry

- Advanced materials with:
  - Increased stiffness, strength and fracture toughness for structural components
  - Increased electrical conductivity for lightning strikes and wiring
  - Increased thermal conductivity for heat dissipation
  - Increased resistance to aging due to temperature gradients, moisture, UV radiation



## Automotive Industry

- Advanced materials for improved performance and durability:
  - Stiffer, stronger
  - Lighter, tougher
  - Heat and pressure resistant
  - Corrosion resistant

## Other Applications

- Materials for energy generation, storage
- Defense
- Electronics
- ...

## Advanced Materials:

- Nanocomposites
- Novel composites
- New metal alloys
- Novel polymers
- Ceramics

**Strong connections between HV electrical and HT novel materials/structures**

# I/UCRC for Novel HV/T Materials and Structures

## Return on Investment

- Consortium of companies
- Research projects selected by members
- Industrial Advisory Board
- Networking between industries
- Access to intellectual property
- Pre-publication access to research
- Access to Center's facilities
- Access to pool of trained students
- Financially subsidized by NSF
- *Only 10% overhead cost*
- **Value much greater than sum of projects!**

## Leveraging

- Access to existing complementary NSF, AFOSR, NASA and DoE funded research
- Access to complementary university, state or privately funded research
- Expertise developed using existing and new (DOE, DARPA, other) grants
- Access to Center's new equipment
- Up to 10:1 leveraging on IUCRC projects

## Budget structure

- Annual membership at \$40K (single vote) or \$80K (double vote)

**Deadline:** Letters of commitment from companies are due by September 15, 2013

Information on NSF I/UCRC at <http://www.nsf.gov/eng/iip/iucrc/>

