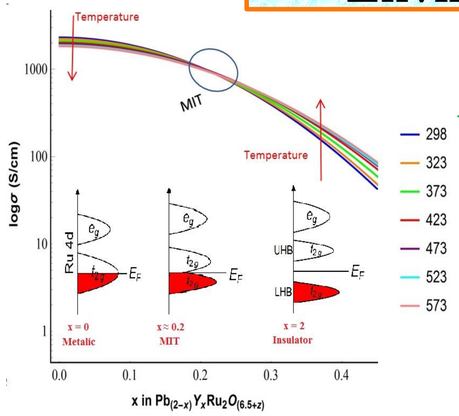
Advanced Materials, Characterizations, and Devices

Sepideh Akhbarifar, Ph.D.

The Catholic University of America (CUA), Department of Physics and Vitreous State Laboratory

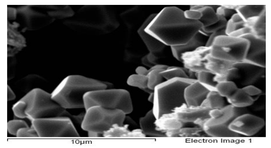
Environmentally related research



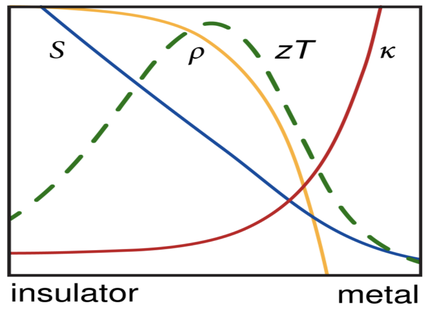
Metal-Insulator Transition (MIT)
Mott-Hubbard Mechanisms

1: Green Energy

Waste heat to electricity



A pyrochlore crystals



2: Climate

Heavily corroded Portland cement mortar

Corrosion resistant, low CO_2 footprint, geopolymer mortar

3: Clean Air

Eliminate dust

My invention

Cyclones & jet-impingement dust < 5 μm

multi-channel spiral dust separator

Interests and Experience

- Overarching interest: materials physics, i.e., advanced materials development, recycling, energy efficiency, sustainability
- Experience: materials development, synthesis, characterization, analysis, electronics, and use of state-of-the-art instruments
- Conducted research on
  - thermoelectric materials (heat to electricity)
  - low CO_2 footprint geopolymer cement
  - high efficiency cyclones de-dusters
- Worked in industry as a process engineer in Iran
- Continued collaboration with Iran University of Science and Technology (IUST) on advanced dust separators
- Familiar with use and capabilities of state-of-the-art instruments, e.g., SEM/EDS, XRF, XRD, Raman, thermal and electrical conductivity, etc.

Expertise, Leadership, Activities

- Reviewer for several scientific journals
- Lead MRS Symposium Organizer for MRS Fall-2022
- Chief executive officer at PARRTO institute in Iran
- Mentoring:
  - Undergraduate Student – MRS (Fall 2019-Boston)
  - High School Summer Intern at CUA (Summer 2016)
- Research adviser – NSF grant summer student
- Member of MRS Early Career Subcommittee
- Member of DC/MD/NoVa Section of ACerS
- Adjunct faculty at CUA, school of Engineering
- Course development and teaching:
  - Experimental Methods for Materials Engineering
  - Introduction to Material Science & Engineering
  - Materials Laboratory
  - Dynamics Laboratory

Publications

- 10 Peer-reviewed publications, several more in preparation or submitted
- 21 Conference presentations - 7 invited – 1 Keynote speaker
- 1 Book chapter on thermoelectric materials
- 2 patents (cyclone efficiency)
- 2 TV interviews

Memberships

- Materials Research Society (MRS)
- American Physical Society (APS)
- American Ceramic Society (ACerS)

Skills

- MATLAB, Mathematica, LabVIEW
- Quick learner based on diverse technical and scientific background
- Experienced speaker and presenter
- Works independently but good match for teams
- Well trained in handling hazardous and radioactive materials, lab safety
- Good leader
- Excellent time management

Honors

- NSF travel grant for Thermoelectric symposium at MRS Fall-2019
- Iran's National Elites Foundation (INSF) research grant
- Honored as a 'Young Women Inventor 2010' by INSF

Education

- Ph.D. in Physics – Materials science from CUA
- MS in Nuclear Environmental Protection from CUA
- MS in Chemical Engineering from IUST
- BS in Chemical Textile Engineering from KAR University