

Center of Excellence for

Novel Energy Materials (CENEMA) at IIT Bhubaneswar Review, October 19, 2016

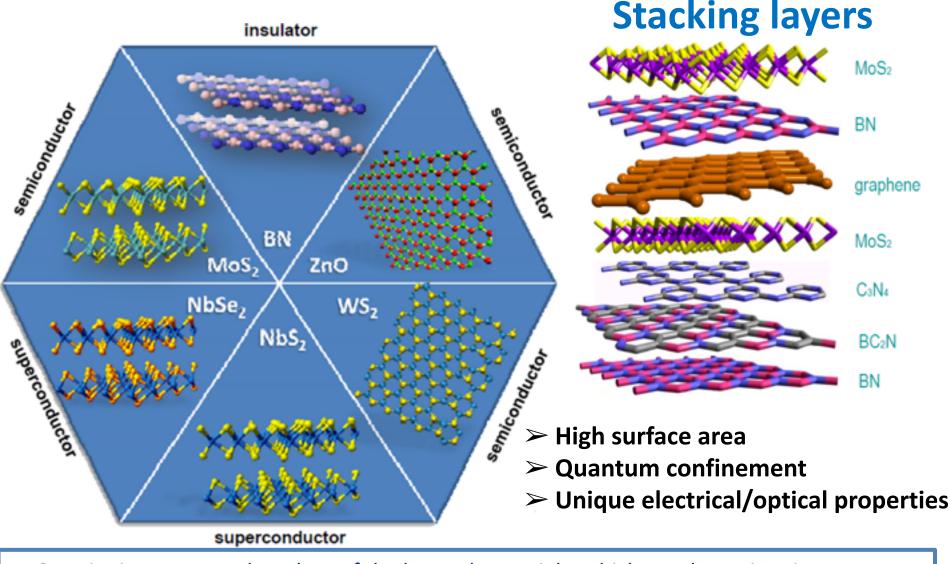




Goal of CENEMA

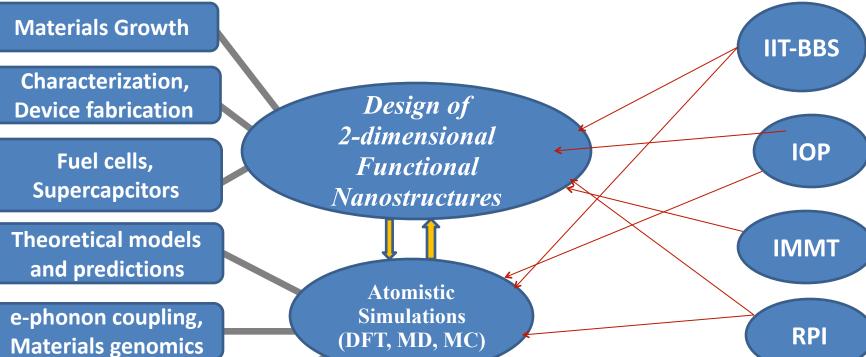
- To provide fundamental understanding for making better energy materials: Materials Genomics applied to a subset of materials for energy.
- Develop and apply methods across the length and time scale: electronic structure, molecular dynamics and continuum scheme.
- Utilize high performance computing (HPC) for realistic conditions.
- Close collaboration with experiments and industrial partners.
- Strong outreach: target K-12 schools through open house, summer teacher camp, etc.

Wide range of 2D Layered materials



- > Our aim is to expose the edges of the layered materials, which are the active sites to achieve enhanced catalytic properties, useful for fuel cells and supercapacitors
- > We follow template approach for this where the graphene arrays act as substrates





Molecular simulation, Electronic properties

RICE Univ.

Applied Materials

TATA STEEL

Facilities created for the Supercapacitors









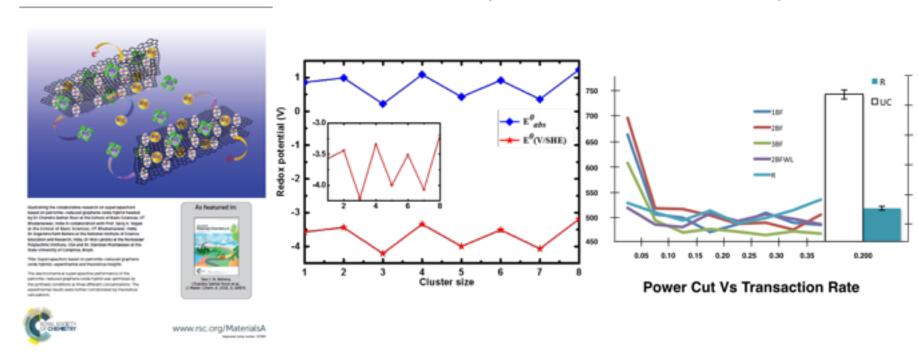


Potentiostat/galvanostat

Coin-cell assembly

Research Highlights

• Supercapacitors based on Patronite-reduced graphene oxide hybrids shown for to have excellent properties (left picture, see poster).



- Novel concept of cluster based electrode proposed to enhance redox potential in metal ion battery better storage (middle picture, see also poster).
- Bio-inspired solar energy network topology investigated for better efficiency (right picture, see also poster).
- Low energy high speed devices based on 2-dimensional spin valve is studied (see poster).

Outreach Highlights

- Collaboration with industries such as NALCO and TATA are ongoing.
- About 1 Crore is obtained from NALCO for looking into advanced research on aluminium including possible use of aluminium in battery technology.
- The first start up on renewable energy is incubated in DST funded TBI.
- A proposal on energy storage with IISc and CECRI is now selected for the next round review by DST.
- The centre provided a hub for many undergraduate students for energy research.

thank you...

