U.S. DEPARTMENT OF ENERGY | Office of Science

# Re-Defining Photovoltaic Efficiency Through Molecule Scale Control

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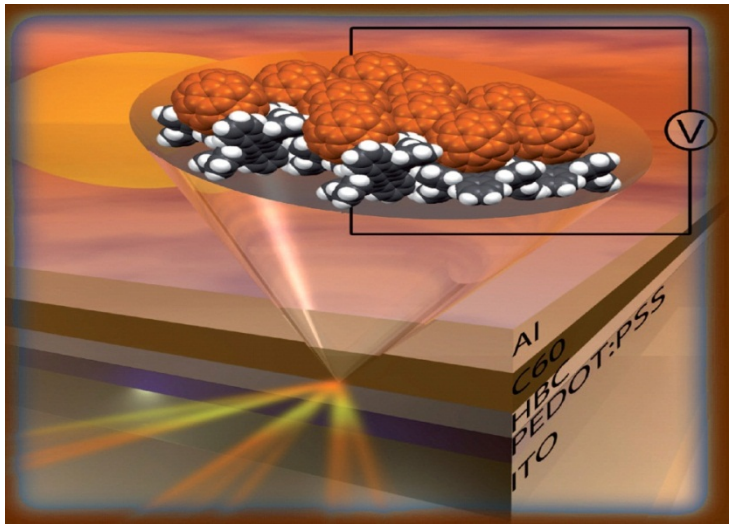
**The Columbia EFRC is creating enabling technology to re-define efficiency in nanostructured thin-film organic and hybrid photovoltaic devices through fundamental understanding and through molecule-scale control of charge formation, separation, extraction, and transport.**




## RESEARCH PLAN AND DIRECTIONS

**Fundamental understanding of photo-physical and kinetic properties on the nanoscale allow us to design systems for efficient photovoltaic generation and separation of charges. New materials including new molecular quantum dots and two-dimensional molecular sheets that can function as conductors (graphene), insulators (boron nitride), or semiconductors (molybdenum sulfide) allow nanoscale control of charge creation, separation, and extraction to provide a basis for revolutionary low cost, high efficiency devices.**

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