Solar Cells: The Energy Source of the Future

Nitin Padture

Professor, School of Engineering Director, Institute for Molecular and Nanoscale Innovation

CURRENT RESEARCH

Efficient and inexpensive solar cells through materials and processing innovations

Solving the world's energy problems is critically important. Solar energy is the cleanest form of renewable resource and it is potentially the most abundant. For example, the potential solar energy capacity in the US alone is 80 terawatts, which is more than all the other renewable sources combined. However, the bottleneck in solar cells is the cost. Therefore, highly efficient, low-cost solar cell technology is the "holy grail" for scientists and engineers. Not surprisingly, 'Making Solar Energy Economical' is one of the fourteen Grand Challenges identified by the U.S. National Academy of Engineering. Dr. Nitin Padture, Professor of Engineering at Brown University, uses his expertise in materials science and engineering to contribute towards solving the world's energy problems. His main motivation is to be able to perform basic and applied materials research that will have a lasting impact on the global community. Using his nearly twenty-five years of experience as a materials researcher, Prof. Padture is likely to make significant contributions that will be monumental for energy use worldwide.

With an impressive combination of expertise in materials synthesis/processing, characterization, properties-measurements, Prof. Padture is seeking solutions to answer some of the most challenging scientific questions with a refreshing perspective. Prof. Padture firmly believes that "all wonderful things come out of basic science." Therefore, his interests are specifically targeted at the basic science required for future technological applications. Thus far, he and his team have made some key advances in the processing of a new type of breakthrough solar cell -- perovskite solar cell -- that is potentially low-cost...

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AFFILIATION

Brown University

EDUCATION

- Ph.D., in Materials Science & Engineering, 1991 , Lehigh University
- M.S., in Ceramic Engineering, 1987 , Alfred University
- B.Tech, in Metallurgical Engineering, 1985 , Indian Institute of Technology, Bombay

AWARDS

- Elected Fellow: American Ceramic Society (2005), American Association for the Advancement of Science (2008)
- Richard M. Fulrath Award, American Ceramic Society (2007)
- Robert L. Coble Award for Young Scholars, American Ceramic Society (1999)
- Young Investigator Award, Office of Naval Research (1996)
- Distinguished Service Award, Indian Institute of Technology, Bombay (2012)

RESEARCH AREAS

Technology, Materials Science / Physics, Photonics / Imaging, Semiconductor

FUNDING REQUEST

Your contributions will support the continued research of Prof. Nitin Padture of Brown University, as he uses his expertise in materials to contribute towards solving the world's energy problems. Donations will fund the necessary $300K/year required to support graduate students, postdoctoral researchers, purchase materials and supplies, pay for use of research facilities, and most importantly, to perform impactful research. In choosing to donate, you will support Prof. Padture, a researcher with past success, as he works towards necessary solutions for the energy crisis.