

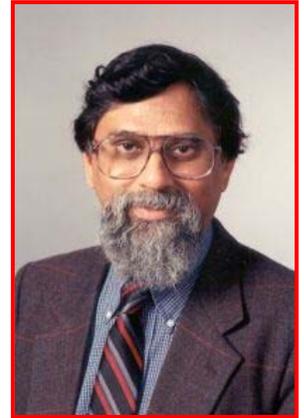


ECE Distinguished Seminar Series

IEEE EDS/LEOS Distinguished Lecturer

Physics and Technology of Nanocrystalline Silicon for
Solar Energy Conversion

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Engineering
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Thursday, May 10, 2007, 1:30 pm. Dreese Laboratory 260

Nanocrystalline Silicon is a very interesting new material for optical and electronic devices. It can be deposited as a thin film on virtually any substrate at low temperatures using plasma deposition. The grain sizes are exceedingly small, of the order of 10-20 nm. Yet, the material shows remarkable minority carrier lifetimes, of the order of 1 microsecond. Clearly, the grain boundaries are passivated during growth, both by H and by a thin amorphous Si tissue. In this talk, I will discuss the growth chemistry of nano Si, its electronic and optical properties and how they related to growth chemistry, and the applications of these materials for solar cells. Designs for improving the solar cell will be discussed. The material has significant promise for producing high quality thin film solar cells. I will also discuss the growth and properties of other related materials such as nanocrystalline Germanium and Germanium Carbide alloys.

Bio: Dr. Dalal received the Ph.D. in Electrical Engineering and an MPA in Economics, both from Princeton University. Prior to joining Iowa State, he was Research Scientist, RCA Laboratories; Consultant and Research Associate, Ford Foundation and Princeton University; Manager, Device Group, Institute of Energy, University of Delaware; Vice President, R&D, Chronar Corporation; and Technical Manager, Spire Corporation and Polaroid Corporation. Since 1988, he has been at Iowa State University as Professor of Electrical and Computer Engineering. Since 1999, he has also served as Director of Microelectronics Research Center at Iowa State. He currently holds the Thomas Whitney Chair in Electrical and Computer Engineering.

His research interests include photovoltaic energy conversion; growth and characterization of new electronic materials and devices; novel processing techniques; plasma beam epitaxy; low temperature processing; thin film heteroepitaxy; hightemperature electronic materials and devices; and new devices for imaging, printing, sensors, and energy conversion. Dr. Dalal has authored more than 120 publications and currently holds 11 U.S. patents.

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