



**PONDICHERRY UNIVERSITY
CENTRE FOR NANOSCIENCE AND TECHNOLOGY**

Special Lecture

On

**“Integrated Electronics Packaging and
Functional Materials @ Nanoscale”**

By

Dr.P.Amalnerkar

Executive Director

**Centre for Materials for Electronics Technology (C-MET)
Under Department of Electronics & Information Technology,
(Govt. Of India) Panchwati, Off Pashan Road, Pune – 411 008.**

Date : 25th March 2013

Time : 3:30 pm

Venue : Seminar Hall, Centre for Green Energy Technology

All are welcome

N. Satyanarayana
21/3/2013 -

Centre Head

Dr.N.Satyanarayana

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**Centre for Nano Science & Technology
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Integrated Electronics Packaging and Functional Materials

@ Nanoscale

D. P. Amalnerkar

Executive Director

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Panchwati, Off Pashan Road, Pune - 411008

Brief outline of the talk

The last few decades have witnessed dramatic advances in the microelectronics industry. The continual race to shrink the circuit elements of microelectronic devices has been a subject of immense interest not only for the scientific fraternity but also for technologists. Interconnection of these shrinking devices to the real world via Integrated Electronics Packaging (IEP) is a pivotal element in this competition. IEP has proved significant miniature circuit technology for HF communications, MEMS and sensors, which is extremely important for the various sectors of electronic industries. At present, C-MET has successfully established "state of art" class 10,000 clean room facility and developed indigenous processes required for buried / on-surface passive components like, resistors, capacitors and inductors using the Low Temperature Co-fired Ceramic (LTCC) technology. However, in order to compete with the global products based on integrated electronics packages, it is absolutely essential to shift the focus of processes from mm and μm scale to nanoscale. Starting from the last decade of 20th century, the nanotechnology boom has resulted in discovery of a host of forms of nanoparticles/nanoaggregates. Some of them are *nanopowders*, *nanotubes*, *nanowires*, *nanoclusters*, *nanosheets*, *nanorods*, *nanodots*, *nanoalloys*, *nanobelts*, *sea-urchin structures*, *flowers*, *nanoplates*, and *nanoneedles*, which have lots of applications, particularly in magnetic materials, nanocomposites, nanodevices, chemical sensors, degradation of toxic chemicals, or even as possible carriers of isotopes for medical applications. Nano-scale packaging would be the advanced and *green* process of interconnecting, powering, cooling, and protecting the nanocomponents made of nanomaterials to form electronic and bioelectronic systems for greatly improved functionality at reduced energy consumption and cost. Nanoscale functional materials play a vital role in the development of *green* technologies as they form essential building blocks of such packages in the form of inductors, capacitors, resistors, optical assemblies, sensors etc. C-MET can deliver in the development of plain and hierarchical nanoscale materials for fabrication of active and passive components which are crucial for the development of such nanoscale packages. A review of C-MET's initiative in this endeavour *vis-a-vis* materials development to the fabrication of final device is furnished in this presentation. **During the presentation, the role of ultra-modern characterization techniques like FE-SEM, FE-TEM with SAED, AFM, Operando XPS, EXAFS and XANES will be extensively covered.**

N. Sathyanarayana

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Head

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1987, he had taken up the Visiting Assignment at Gifu, University, Japan & returned to join the post of Pool Scientist at NCL, India.

In 1991, he joined Centre for Materials for Electronics Technology(C-MET) as a Scientist and rose to the position of Director of C-MET, Pune. In March 2009, Govt.of India has appointed him as the Executive Director of C-MET to look after its 3 centers located at Pune, Hyderabad & Thrissur. While placed at C-MET, he revisited Gifu University, Japan, during September-December 1993 & August-November 2000 as an AIEJ Researcher and worked as a Brain-Pool Visiting Scientist at Korea Research Institute of Chemical Technology, Daejon, Korea during 2006-2007. Recently, he has been appointed as Visiting Professor at King Saud University, Riyadh, Saudi Arabia.

He has published more than 135 papers in peer-reviewed international journals, won 12 awards for oral/poster presentations in various national/international symposia. There are 20 Indian Patents & 2 Technology Transfers to his credit. **His current Scholar Google H index is 24** (<http://scholar.google.co.in/citations?hl=en&user=ot3a8WkAAAAJ>). He has contributed a chapter in a book entitled "Thick Film Sensors" published by Elsevier. He has worked/has been working as Guest Editor of Materials Science & Engg.(B), Editorial Board Member of the Journal Carbon Science & Technology, Member of International Advisory Committee to Special Issue Journal Solid State Phenomena. He is regular reviewer of the contributions submitted to Advanced Materials, Advanced Functional Materials, Crystal Growth and Design and many other journals. He is a Member of Academic Council, Board of Directors & Board of Studies of State & National Universities as well as leading private institutes like IIT, MIT, Pune & Vel-Tech Technical University, Chennai. He is also a council member of prominent professional bodies/societies. He has been actively involved in Grant-in-Aid Working Groups of Department of Electronics & Information Technology, Govt.of India. He is a Fellow of Maharashtra Academy of Sciences. **He is recipient of the Materials Research Society's prestigious MRSI Medal Award for the year 2008 for his significant contributions in Materials Science and Engineering.**

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