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7. Brief account of your research interests with special focus on Nano Science and Technology (strictly within 300 words):

Dr A.Kathalingam, Head, Nanotechnology Programme, Periyar Maniammai University has working knowledge in thin film deposition techniques such as electrodeposition, sputtering, thermal evaporation, spray coating and others. In his credit he has published more than ten research papers in reputed international journals about his works on electrodeposition of various technologically important II-VI semiconductors (ZnSe & HgZnSe).

He also has experience in characterizing thin films using Scanning electron microscopic, XRD, EDAX, AFM, UV-VIS spectrometer, Photoluminescence and Laser Raman, Electrical measurement (Electrical resistance and conductivity) and Photoelectrochemical solar cell studies.

He was associating the following persons from different countries during his doctoral work

1. Dr T. Mahalingam, Alagappa University
2. Dr S. Velumani, Mexicon Institute of Petroleum, Mexico
3. Dr J.P. Chu, National Taiwan Ocean University, Taiwan
4. Ho Sun Moon, Ajou University, Korea
5. Yong Teak Kim, Ajou University, Korea

Tamil Nadu State Council of Science and Technology has awarded him 'Young Scientist' fellowship during 2000 to recognize

his contribution towards research. Using this fellowship he has gained working experience in various thin film growth techniques under the guidance of Prof. S.V.Subramaniam, Department of Physics, and Indian Institute of Science, Bangalore.

In the present position as coordinator of Nanotechnology working group of PMU, He is taking forward steps to establish Nanomaterials synthesis facilities in PMU. As a first step we are going to purchase Scanning Probe Microscope for our nanotech research.

He is working on CNT and TiO₂ thin films for Dye sensitized solar cells in associating with our overseas visiting professors Dr Namas Chandra (Associate Dean of Research, University of Nebraska, Lincoln) and Dr Padma Kumar Nair (University of Texas at Dallas)

PMU has well-established laboratories having facilities to synthesis nanostructured materials. Presently four M.Phil and two Ph.D students are working under the guidance of Dr A. Kathalingam in the synthesis of carbon and ZnO nanostructures using wet chemical methods.

Research Interest

Specific Research interests are

- To prepare Nano structures such as quantum wires (nanotubes) and quantum dots of technologically important II-VI compounds; CdS, CdTe, PbS, ZnSe and ZnO, III-V compounds (GaN) and Carbon nanostructures using
 - Chemical Vapour Deposition
 - Sputtering
 - Vacuum Deposition and

➤ Electrodeposition

- To study the properties of the grown nanostructures with the use of different techniques and to study the viability of the grown nanostructures to use in the fields

1. Solar energy conversion
2. Hydrogen production and storage and
3. Light emission.

Relevance of the Research

Lighting is a basic human need like clean water, food, sanitation and shelter. In this new era of information and market globalization, appropriate lighting should be considered a human right. Two billion people, one third of humanity, still has no access to electricity, and thus relies on fuel-based lighting, a dangerous alternative that is unhealthy, expensive, and offers very poor levels of illumination. This lack of light makes it difficult to perform most evening activities including studies by children and adults alike and therefore represents a significant barrier to human development and hence country economic growth. It is estimated that 25 to 30 percent of the world's total electricity production is consumed by lighting. It is therefore important to find alternative forms of energy and economic method of lighting, particularly in the developing world like us, where demand is growing at an accelerating rate as a product of economic development. The fewer power stations constructed to meet the needs of lighting require more capital available for other investment and they produce fewer emissions and generate waste which pollute the environment. So, it is need to develop technology in the fields of solid-state lighting (SSL), renewable energy and energy storage at all levels.

Organic solar cells are gaining attention due to their potential to be fabricated at low cost onto lightweight and flexible substrates. Nanomaterials are the potential candidates in the development of photovoltaics, fuel cells, hydrogen-storage systems, supercapacitors, and rechargeable batteries and in white light emission (CdS). Sintered Quantum dots that produce white light could be the light bulb's successor. The white-light quantum dots, by contrast, produce a smoother distribution of wavelengths in the solar spectrum

Semiconductor nanocrystals (NCs) have become immensely popular due to the ability to tailor their optical and energetic properties by varying the size, shape and material. Nanocrystals are currently exploited in a range of applications ranging from biological imaging, quantum computing, and solar cells to electroluminescent devices. Various quantum-well structures (QWS) are currently used for manufacturing of light emitting detection systems

Carbon nanotubes have also been identified as having the potential to store hydrogen at higher capacity than other known materials. A hybrid technique could be developed by integrating PVC and PEC, the photovoltaic cell is to produce electricity and the photoelectrochemical cell is to produce hydrogen from the electrolysis of water. Both will use specially designed materials based on arrays of nanowires with uniform orientation

The main focus of my research is to develop nanostructured materials to optimize the efficiency of both the photovoltaic cell and the photoelectrochemical cell for solar energy conversion and to study the efficiency of grown carbon nanotubes in hydrogen storage and water purification.

8.	Keywords related to your research interests (maximum 10, different lines separated by commas)

Nanomaterials synthesis,
Dye-sensitised solar cells,
Photoelectrochemical solar cell,
Electrodeposition,
Chemical Bath deposition,
Wet chemical synthesis,
Carbon nanotube,
ZnO nanoparticle,
ZnO nanorod,
Semiconductor nanostructures.