Brief Report of Scholar in Residence Programme under Erudite Scheme

Scholar in Residence Programme under Erudite Schemesponsored by the Kerala State Higher Education Council (KSHEC) was organised by the Centre of Excellence in Advanced Materials, Cochin University of Science and Technology during 02-01-2019 to 04-01-2019. **Prof.AyodhyaNath Tiwari**, Head of the Laboratory for Thin Films and Photovoltaics, Swiss Federal Laboratories for Materials Science and Technology (EMPA), Switzerland, was invited to the programme. Prof. Tiwari is a renowned scientist in the area of thin film photovoltaics who holds several world record in the development of high efficiency solar cells, flexible thin film solar cells.Prof. Tiwari is the Co-founder of a spin-off company, FLISOM AG in Zürich, Switzerland, who developed the basic technology for the production of flexible solar cells on plastic foils resulted in world record efficiency.

Prof. Tiwari visited two of the established departments, Department of Physics and International School of Photonics, at Cochin University of Science and Technology. He also visited the Centre of Excellence in Advanced Materials, Cochin University of Science and Technology. During his visit, there were interaction sessions with students, research scholars, post docs, faculty, industry people etc., wherein he proposed his vision and perspective on the research culture and the route towards translating our fundamental research into deliverables fit for technological applications. He could also guide the audience on how symbiotically a research supervisor should move for fruitful and cutting-edge achievements.

Prof. Tiwari gave two lectures as part of the erudite programme. His first lecture was on “Solar cells: Unfolding the opportunities for a better sustainable future”. This talk was generally on the basics of solar cells, estimation of various parameters, needs and advantages of solar cell technology. He gave a brief introduction on the progress of photovoltaics and the need for thin films in photovoltaics. He also discussed on the preferred choice of semiconductors, the calculation of efficiency and the present status of efficiency attained internationally. His second lecture was on the “Advancements in thin film solar cells and emerging opportunities”. This talk was focussed on the industrialization of thin film solar cells. He discussed on the scope and advantages of CIGS flexible cells, green-house gas reduction etc.Prof. Tiwarimentioned about the 20.4% record efficiency attained in a Copper Indium Gallium Selenide based solar cell at EMPA, Switzerland. He also suggested that these solar cells are comparable to the already established silicon based solar cells. Regarding the industrialization, he had interesting suggestions and prospects on the basic design of a

module and how the cost of a module can be kept minimal. He could also enlighten the audience on the merits and demerits of perovskite based solar cells.

Besides the highly informative lectures, the visit to the Nanophotonic and Optoelectronic Devices laboratory for lab demonstration was an excellent opportunity for the researchers and students pursuing photovoltaics. The students could directly learn the basic procedure followed for the fabrication of thin film solar cells from a well-known expert in this field. He also gave an idea on the safety measures to be taken and the methods of silicon waste management. He also demonstrated the characterization of thin film solar cellsby explaining the procedure and significance of efficiency measurements, quantum efficiency measurements etc.This was followed by an active interaction with the faculty and research scholars working in the field of solar cells. A group discussion was arranged between Prof. Tiwari and a group of faculty members from CUSAT on 3rd and 4thJanuary 2019 with a primary objective of identifying the possible areas of mutual research interest. The meeting highly befitted in exploring the various possibilities for many future collaborative research

A special discussion forum was held on 4th January 2019. It aimed to evolve possible collaboration with Cochin University of Science and Technology and Swiss Federal Laboratories for Materials Science and Technology (EMPA) and ETH Zurich, Switzerland. The possibility of collaboration through “Swiss Excellence Award” for which the proposal will be called during August 2019 was also discussed. A concept note in this regard has been prepared. Prof. Tiwari also mentioned the possibility of including Swiss Federal Laboratories for Materials Science and Technology (EMPA) in the Scheme for Promotion of Academic and Research Collaboration (SPARC).