

**Summary of e-STC on**  
**“Recent Trends in Advanced Materials and Devices”**

**(21-25 Sep 2020)**

TEQIP-III sponsored one week online Short-term course on “Recent Trends in Advanced Materials and Devices” was organised jointly by the Department of Physics and Department of Electronics and Communication Engineering, NITJ from 21-25 September, 2020.

Around 600 participants from various universities, institutes, research organisations and industries registered for the course and attended a series of expert lectures by eminent scientists and academicians all over India. The event was coordinated by the Convener Dr. H. M. Mittal (Associate Professor, Physics) and coordinators Dr Praveen Malik (Assistant Professor, Physics) and Dr Ashish Raman (Assistant Professor, Electronics and Communication Engineering). The organising team provide the participants with an insight to understand and utilise the unique properties and interaction of novel materials, their physics and chemistry for the design and development of state-of-the-art next-generation materials for devices to meet the needs of the relevant industry, space, defence and research organization.

This e-course was inaugurated by Prof. L.K. Awasthi, Director, Dr B. R. Ambedkar National Institute of Technology, Jalandhar on 21 Sep, 2020. Prof. Awasthi appreciated the efforts of course coordinators to rope-in eminent speakers from leading research universities to deliver talks on different advanced materials technology. He further encouraged the participants for the responsible development of products based upon such technologies to meet out the most pressing human and societal needs. Prof. R. K. Garg gave an overview of the institute and achievements during this pandemic time. Dr Harleen Dahiya motivated the participants and present the current status of the department.

As an introductory note, Dr Praveen Malik welcomed all the participants and gave an objective of enriching the participants with the basic concepts and current knowledge of scientific advancements in the area of advanced functioned materials and devices.

**Day 1**

In the inaugural talk on Day 1, the keynote speaker Prof. K K Raina (VC, DIT University Dehradun) delivered an impressive and comprehensive lecture on “Materials for New Millennium: Technological Developments” and graced the occasion. Dr Raina emphasised on

the critical role of materials in advancing technology and societal needs in the new millennium. He also focussed on current and future roles of materials in health, space and defence technology. In the afternoon session, Prof. Ramesh Chandra (Head IIC, IIT Roorkee) delivered a talk on “Manipulation of Materials at Nanoscale for Smart Applications”. He discussed the recent nanomaterial processing in various frontier science field including biomaterial, optoelectronics, and so on. He also provided a lot of useful information for tailoring the morphology of film or particle at nano dimension for sensors. In the closing session, Dr Shantanu Pal (Associate Professor, IISER Mohali) talked about “Discotic Self-Assembled Materials”.

## **Day 2**

Day 2 started with a very important lecture by Prof. Shantanu Bhowmik (Amrita Vishwa Vidyapeetham, Coimbatore) on “Recycling of Plastic Waste to Plastic Composite Products: Waste to Wealth”. The talk was very impressive, highly appreciated and acknowledged by the audience. Prof. Beer Pal Singh (Physics Department, CCS University Meerut) also enlightened the audience with a lecture on “Synthesis, Characterization and state-of-arts applications of Metal Oxide Nanomaterials”. Dr Gurumurthy Hegde (Prof. CNR Rao Chair Professor, BSN Centre for Nano-Materials & Displays BMS CE, Basavanagudi Bangalore) spoke on “Nanoscale Alignment of Shape Anisotropic Molecules using Light as a tool for a new generation: Flexible Displays”. Prof. Puneet Sharma, (SPMS Thapar University Patiala) delivered a final talk of the day on “Processing and Properties of highly oriented Barium Hexaferrite thick Films for Microwave Applications”.

## **Day 3**

In the first session of day 3, Prof. P. K. Bajpai (Physics Department, Central University, Bilaspur, CG) delivered a lecture on “Recent advances, Challenges and Road Ahead in the development of Multiferroics “. Prof. Pawan Kumar (NIT Rourkela) gave a talk on “Microwave Assisted High Energy Ball Milling Synthesis of Functional Material”. In the second half of the day Prof. Pankaj Kumar (Chitkara University, Punjab) addressed the audience on the topic “Physical Interactions of Nanoparticles with Liquid Crystals for the advancement in Display Technology”, Dr Akash Deep (Sr. Scientist, CSIO, CSIR Chandigarh) gave a very motivating talk on “Metal Organic Frameworks and derived structures for Super-Capacitor Applications”.

## **Day 4**

Prof. S. Bhowmik (Amrita Vishwa Vidyapeetham, Coimbatore) gave another very important lecture on High-Performance Hybrid Composite for Aviation, Space and Defence for Self Reliance India. The talk was very impressive, highly appreciated and acknowledged by the audience. Prof. Lokendra Kumar (Allahabad University) gave a lecture on “Emerging Hybrid Perovskite materials for next-generation photovoltaics”. The day 4 ended with a final talk by Dr Gargi Khanna (NIT Hamirpur) on the topic “MEMS”.

Final day of STC started with the first session by Dr K. L. Baishnab (NIT Silchar) on “Materials for Solar Cell Design”. Dr Balwinder Raj (NITRR, Chandigarh) delivered the second lecture on “Semiconductor Materials and Multi-Gate Devices”. The final talk of this knowledge enhancing Short Term Course was presented by Dr Santosh (NIT Allahabad) on the topic “Nanoscale Semiconductor Devices”.

The event was concluded with a feedback session in which participants expressed their views and showed great satisfaction at the successful completion of the event. Participants also suggested to conduct such short term courses/workshops/seminars in nanotechnology as exposure to these upcoming technological innovations in advanced materials and devices that will enlighten the younger researchers and is need of the hour. This STC offered a wide range of lectures in liquid crystals and devices, nanostructured materials, thin films, MEMS and nano-electronics, solar cells, biosensors, super-capacitors etc.

In last Dr Praveen Malik, Coordinator, e-STC express his sincere thanks to all the invited speakers for sharing their research experiences with the participants and acknowledged the full support of Prof. L.K.Awasthi, Director, Dr B. R. Ambedkar National Institute of Technology, Jalandhar.