

MITS Communication/ Report on Workshop/Department of Physics/06 - 16 May 2022

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MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE

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Report on
A Ten - Day Workshop
The Participation of MITS Faculty in
“Hands-on-Training on Fabrication & Characterization of Nano electronic Devices”,
Center for Nanotechnology,
IIT Guwahati
06 - 16 May 2022



Attended & Submitted by: Dr. Sunku Sreedhar, Assistant Professor, Department of Physics

The “Hands-on-Training on Fabrication & Characterization of Nanoelectronic Devices

Characterization” organized by Centre for Nanotechnology at the Indian Institute of Technology Guwahati and sponsored by Ministry of Electronics and Information Technology (MeitY), Govt. of India under INUP-i2i program was successfully concluded between 6th -16th May 2022. There is active participation by all the participants coming from various places across the country.

ABOUT INUP

The Indian Nanoelectronics Users Program (INUP) was conceived and supported by MeitY and the Office of the PSA as an integral part of the initiative of establishing a Centre for Excellence in Nanoelectronics (CEN) at both IISc, IIT Bombay, IIT Delhi, IIT Madras, IIT Guwahati. To facilitate and support the generation of expertise and knowledge in nanoelectronics through participation and utilization of the facilities established

at the Centre of Excellence in Nanoelectronics at IISc Bangalore, IIT Bombay, IIT Delhi, IIT Kharagpur, IIT Madras and IIT Guwahati by external users.

The Program supports Medium-term projects: Medium-term projects and Short-term measurements/ fabrication: Short-term projects and may involve device modelling or fabrication or characterization, or a combination of two or more of these aspects.

During Program: 6th - 16th May 2022. 1st offline Hands-on-Training on Fabrication & Characterization of Nanoelectronics Devices Characterization, held at Centre for Nanotechnology, IIT Guwahati,

The aim of Hands-on training realization of different nanoelectronics devices with the facilities used in the center for nanotechnology. Two days for each device fabrication and characterization. In ten days, total 5 different nanoelectronics devices fabrication and characterization has been demonstrated by scientists from the institute.

06th to 07th May 2022 (two days): Fabrication of organic Field Effect transistor OFET and followed by next day characterization and report writing.

Organic thin film transistor become very important the rapid improvement of flexible electronics. The development of OTFT can be immensely benefitted to develop devices such as E-paper, flexible OLEDs, Organic memory, flexible display devices, smart textile products etc. It has specific advantages over conventional silicon-based devices, it is low cost in fabrication, can support to make flexible electronics, tunable band gap, the processing of OFET on large areas is less cumbersome. Hence, OFET are become prominent materials for electronics.

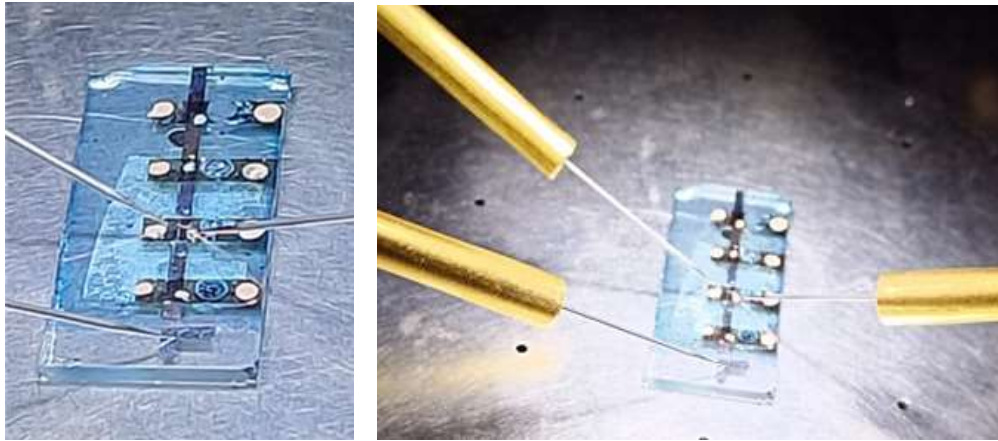


Figure (1) : Final Fabricated OTFT device.

08th to 09th May 2022 (two days):

Fabrication of Surface Acoustic wave (SAW), and characterization of the device next day and report writing and interaction with the scientist.

Acoustic Wave devices are important in telecommunications, sensing applications and various industries from past few decades due to its miniaturization and low power consumption. Piezo electric material responds to applied voltage in the form of displacement based on inverse piezoelectric effect. Surface Acoustic Wave (SAW) devices works based on piezoelectricity principle, to generate surface acoustic waves Interdigital transducers (IDTs) are needed to pattern on piezoelectric material.

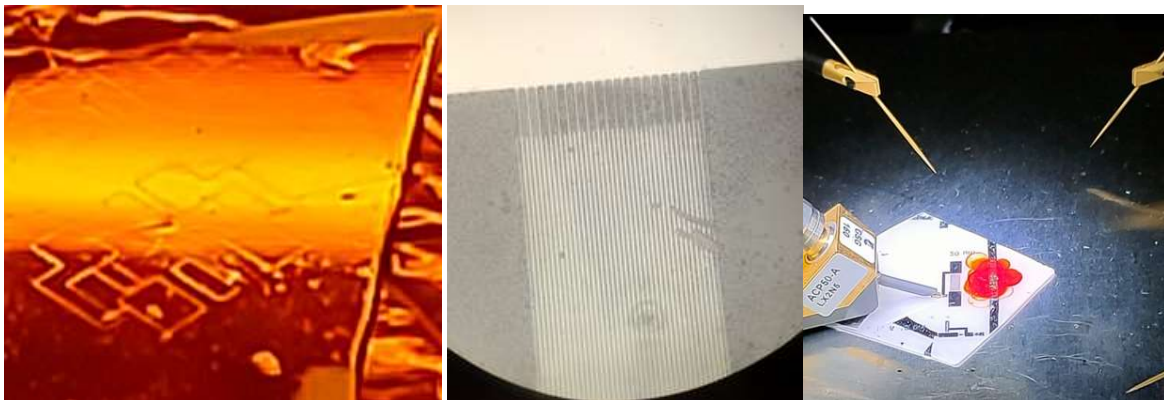


Figure 2: The IDT pattern developed on Al substrate by photolithography. Left side electrode's part, (b) electrodes fabricated terminal part (c) SAW device characterization

10th to 11th May 2022 (two days):

Fabricated MOS capacitor structure follows as Metal/Dielectric/ Semiconductor/ metal electrode shown

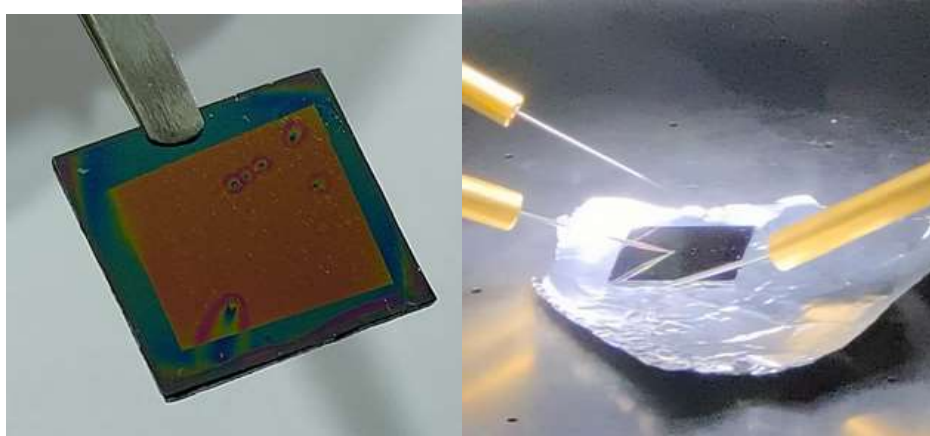


Figure:3. MOSCAP fabricated and MOSCAP under Device under test.

12th to 13th May 2022 (two days):

The use of microchannel can be allowed to examine the microrheological dynamics of different fluids, reaction kinetics in the real fluidic environment and fluid dynamics of different of oils etc. can be investigated. The present project demonstration of pattern moulding of 'T' shaped channel for examining of flow of different fluids.

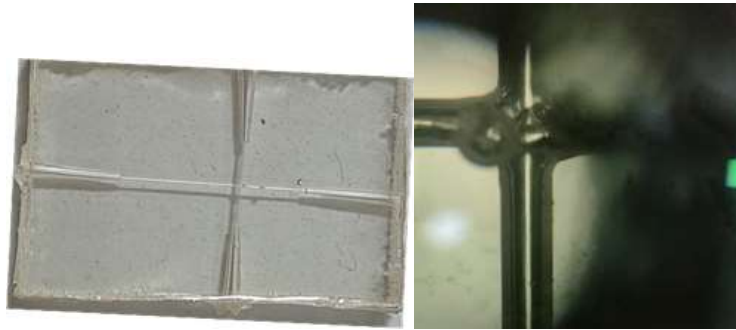


Figure 4: Microfluidic channel fabricated, and flow dynamics of different liquids investigated.

14th to 15th May 2022 (two days): OLED fabrication and characterization

An organic light-emitting diode (OLED or organic LED) is a light-emitting diode (LED) in which the emissive electroluminescent layer is an organic compound film that produces light in response to an electric current. This organic emissive layer lies between two electrodes, one of which is usually transparent. OLEDs are utilized in devices like television screens, computer monitors, and portable systems like smartphones and handheld game consoles to create digital displays. White OLED devices for use in solid-state lighting applications are a prominent focus of study.

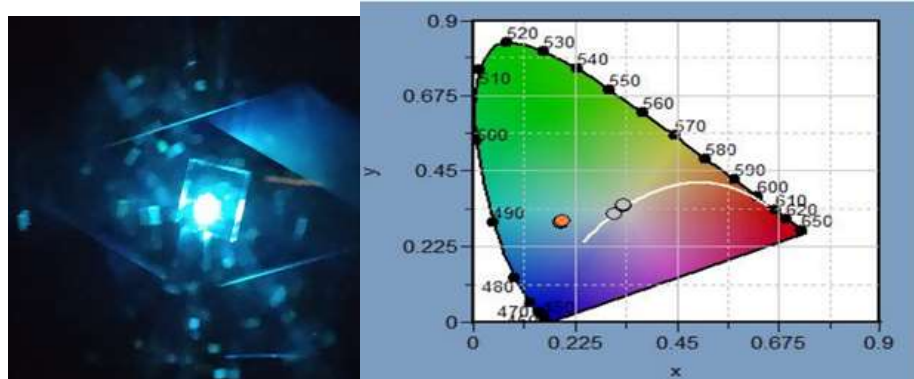


Figure 6: OLED emission blue color, and it's characteristics CRI curve

16th May 2022 MCQ and Valedictory

MCQ test has been conducted based on the training given in 10 days. Feedback and interaction session with faculty members in CNT, IIT G. Valedictory followed. The program conducted in fantastic manner. I gained exposure of different nanofabrication devices and motivated to research in this direction. This is good unique opportunity for young researchers to gain research exposure on nanofabrication techniques.

I thank MITS management for providing me an opportunity for attending this great workshop. I thank principal sir, vice principal (admin), Dean R&D, and our Physics HOD for providing valuable support.



CERTIFICATE



With regards,

Dr. C. Kamal Basha, ME, PhD.

Vice Principal - Administration

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