



Two - Day National Seminar
on



ज्ञान-विज्ञान विमुक्तये

INNOVATIONS IN PHYSICS OF MOLECULES AND MATERIALS (IPMM - 2022)

28th & 29th October, 2022

Sponsored by TSCHE & UGC



PROGRAMME
&
ABSTRACTS

S. Srinivas
HEAD
DEPARTMENT OF PHYSICS
UNIVERSITY COLLEGE
KAKATIYA UNIVERSITY
WARANGAL - 506 009



Organized by

DEPARTMENT OF PHYSICS

KAKATIYA UNIVERSITY

WARANGAL – 506 009. TELANGANA, INDIA

Keynote address

Indigenous Development of Advanced Ceramic & Composite Circuit Materials for Wireless Communication Applications

Dr. R. Ratheesh

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India's vision for Atmanirbhar Bharat has provided impetus to realize the goal of indigenization on critical electronic materials such as SiC semiconductor wafers, microwave ceramics and composites, quantum materials, Low Temperature Co-firable Ceramics (LTCC), energy materials etc. With the advent of novel materials, the personal communication services and other wireless technology industries viz. direct broadcasting, global positioning, mobile communication systems etc. have witnessed an explosive and unprecedented growth in applications. Dielectric properties of packaging materials significantly influence the performance of high-speed microwave devices. Electrical characteristics of the microelectronics devices such as signal attenuation, propagation velocity and cross talk are influenced by the dielectric properties of the packaging substrate. In order to meet these requirements, novel materials with high dielectric constant and low loss tangent together with near zero temperature coefficient of resonant frequency are needed. High dielectric constant reduces the circuit size since the wavelength traveling through the medium is inversely proportional to the square root of dielectric constant whereas extremely low loss tangent improves the signal integrity and avoids cross talks. Cu-cladded ceramic filled PTFE laminates are the ideal choice for high end microwave circuit fabrication owing to their tight dielectric tolerance, superior loss tangent and ease of machinability. Such high-end microwave circuit boards are still a proprietary product of handful of multinational industries and they fall under embargo category. Understanding the need for indigenous technology, C-MET has developed and patented process methodology coined as SMECH process comprising of Sigma

Mixing, Extrusion, Calendering followed by Hot pressing to fabricate dimensionally stable, planar and isotropic PTFE/ceramic composite laminates. Pore free laminates have been fabricated by incorporating variety of ceramic particulates in the PTFE matrix through SMECH process. Silane coating has been done on particulate ceramic fillers to preclude moisture absorption. Waveguide cavity perturbation technique has been employed to accurately determine the dielectric constant and loss tangent of PTFE laminates in the X-band region. Wide variety of filled PTFE substrates have been developed with dielectric constant ranging from 2.2 to 14.8 together with ultra-low loss tangent

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Dated 06-12-2022

To,
The Director,
IQAC
Kakatiya University.

Dear sir,

Sub: Kakatiya University – Dept. Of Physics -Conducted a Two-Day National Seminar on ‘Innovations in Physics of Molecules and Materials (IPMM-2022)’ on 28th and 29th October,2022. Submission of Departmental activity to IQAC- Request- Regarding.

I am happy to inform you that Department of Physics, Kakatiya University conducted a Two- Day National seminar on ‘Innovations in Physics of Molecules and Materials (IPMM-2022) on 28th and 29th October,2022. In this seminar, Director, CMET has given key note address to the audience of IPMM-2022. Hence, I am submitting his key note speech and some photographs of IPMM-2022 for NAAC purpose.

Thanking you,

Yours faithfully,

Head
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