November 25 – 28, 2018 – Chiang Rai, Thailand

Special Session proposal

Microwave and millimetre-wave materials for wireless industry

Special Session Organizers

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Aim:

The aim of this special session is to bring together microwave materials research community and the wireless communication engineers and technologists as well as business community to better understand the needs and challenges of the wireless industry when it comes to materials to be used in the 5G and ultimately 6G communication networks and communication satellites. Microwave ceramics with low dielectric are essential for wireless devise miniaturization. It has been used as dielectric resonators and filters in cellular base stations, cell-phones and input multiplexors for communication satellites. While the current microwave and wireless industry relies on low-loss ceramics and LTTC technology for passive applications, new materials concepts based on the metamaterials and carbon nanotechnology has entered development stage and may soon replace traditional ceramics. These include band-stop and band pass filters as well as antennas based on the metamaterials and graphene nanosheets. Therefore, this session aims to cover both traditional and emerging materials for wireless communication. It will also inspire a closer interaction with industry and bring new ideas and concepts to the wireless materials community

This special session will be focusing on (but not limited to) the following topics:

- Microwave dielectrics and ferrites
- Millimeter-wave materials
- Metamaterials for microwave and millimetre-wave devices
- LTCC materials and composites
- Electric/magnetic-field tuneable (multiferroic) materials for microwave applications
- SAW, BAW, DR filters, duplexers and multiplexors
- Input and output multiplexors for communication and exploration satellites
- (Meta)Materials for antenna technologies
- Electromagnetic absorbing materials

Name of the Track the Special Session fits in: Wireless Communications, Vehicular Technology, Information Theory and Aerospace & Electronic Systems.

Tentative titles of at least 5 contributions:

1. Current status of research on low-loss dielectrics for microwave and millimetre wireless applications.

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2. Effect of the off-stoichiometry on the atomic order and dielectric loss in the $Ba(Zn_{1/3}Ta_{2/3})O_3$, and $Ba(Co_{1/3}Ta_{2/3})O_3$-based X-band microwave dielectric resonators.

Jintara Padchasri, Institute of Science and NANOTEC-SUT COE on Advanced Functional Nanomaterials, Suranaree University of Technology, Nakhon Ratchasima 30000, THAILAND, E-mail: jintara_liwliw@hotmail.com

3. The effect of defects on the microwave dielectric properties of $BaMO_3$ (M = Ce^{4+}, Pr^{4+}, Tb^{4+}) f-electron perovskites.

Phieraya Pulphol, Electroceramic Research Laboratory, College of Nanotechnology, KMITL, Bangkok, 10520, THAILAND, E-mail: np.nattakarn@gmail.com

4. Tape casting and characterization of glass-free LTCC for microwave applications.

JJ.Bian, Department of Inorganic Materials, Shanghai University, Shanghai 200444, CHINA. jjbian@shu.edu.cn

5. Facial synthesis and growth mechanism of Scheelite-type microwave dielectric materials

Naratip Vittayakorn, Advanced Materials Research Unit, Faculty of Science, King Mongkut's Institute of Technology Ladkrabang,

Bangkok, THAILAND, E-mail: naratip.vi@kmitl.ac.th

6. Synthesis and characterization of $Zn_3Nb_2O_8$ and $ZrTiO_4$ for microwave applications.

Anurak Prasatkhetragarn, Department of Materials Science, School of Science, University of Phayao, Phayao 56000, THAILAND,

E-mail: prasatkhetragarn@yahoo.com

7. Synthesis, formation and characterization of niobate-based materials for potential microwave applications

Supon Ananta, Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200,

THAILAND, E-mail: suponananta@yahoo.com

8. Perspectives on standard test methods for measuring electrical permittivity and magnetic permeability of materials at microwave frequencies

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