

Workshop / Radionica

“Innovation in engineering design”

“Inovacije u inženjerskom projektiranju”

27-28. January 2011, Rijeka

Innovations in the development of microelectronics components

Prof. Goran Stojanović, associate professor

Faculty of Technical Sciences, Serbia



- ❖ Established 2004. with the idea to connect researchers from the Faculty of Technical Sciences in the field of electronics and multidisciplinary fields.
- ❖ Within the Center 3 FP7 projects, 2 EUREKA projects, 3 COST projects are currently in progress.
- ❖ Well-established and developed cooperation with industry.
- ❖ Around 16 published papers, per year, in leading peer-reviewed journals with impact factors.
- ❖ Staff: 12 professors, 15 young researchers or PhD students and 4 technicians.
- ❖ Plans – to be the Center of excellence in electronics and leader in this field in SEE region.

Services:

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27-28. siječanj 2011, Sveučilište u Rijeci – Tehnički fakultet



Center for Integrated Microsystems and Components
University of Novi Sad, Faculty of Technical Sciences



- ❖ Design and fabrication of electronic components and circuits on the PCB (printed circuit board) using modern rapid prototyping machine LPKF ProtoMat S62.
- ❖ Design and fabrication of components, circuits and systems (such as RFID tags, ID cards, sensors, etc.) on flexible substrates (paper, foil, ceramics) using Dimatix printer.
- ❖ Design, modeling, simulation and fabrication of different type of sensors (temperature, pressure, humidity, etc.) for application in automotive industry, civil engineering, food industry, medicine, etc.
- ❖ Specialized training courses in the field of software tools for simulation of electronic components as well as in the emerging fields such as embedded systems, organic electronics, nanotechnology.

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International projects:



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1. FP7, REGPOT project: *“Reinforcement of Research Potentials of the Faculty of Technical Sciences in the Field of Post Silicon Electronics”* (APOSTILLE - no. 256615, coordinator: prof. Goran Stojanović), 2010-2013.



2. FP7, ICT-2009.6.3.b, project: *“Smart Control of Demand for Consumption and Supply to Enable Balanced, Energy-Positive Buildings and Neighborhoods”* (SmartCoDe - no. 247473, coordinator: prof. Veljko Malbaša), 2010-2013.



3. FP7, IRSES project: *“Multiband Electronically Reconfigurable Microwave Devices and Antennas for a New Generation of Wireless Systems”* (MultiWaveS, coordinator: prof. Vesna Crnojević-Bengin), 2010-2013.



4. EUREKA project: *“New Generation of 3D Integrated Passive Components and Microsystems in LTCC Technology”* (IPCTECH - no. E!4570, coordinator: prof. Goran Stojanović), 2009 – 2011.

National projects:



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“Innovative electronic components and systems based on inorganic and organic technologies embedded in goods and consumer products”, project no.: TR32016, 2011-2015, (coordinator: prof. Ljiljana Živanov)

“Nanopowder synthesis and ceramics and nanocomposites processing with specific electrical and magnetic properties for electronics applications”, broj projekta: III45021), 2011-2015, (coordinator: prof. Mirjana Damnjanović).

“*Realization of high performances micro-sensors for operation in extreme environmental conditions*”, project no. 114-451-01009/2008-01, 2008-2011, (coordinator: prof. Goran Stojanović)

Cooperation with industrial sector:

- **Littelfuse Ireland Limited, Ireland**



- **Test Laboratories International Inc., USA**



- **ELSYS Design, Paris, France**



- **STMicroelectronics, Pavia, Italy**



- **Hotwell, Klingenberg, Austria**



- **Fotec, Wiener Neustadt, Austria**

- **HDL Design House, Belgrade, Serbia**



- **ICM Electronics, Novi Sad, Serbia**



- **IRITEL, Belgrade, Serbia**



- **NIS – Naftagas, Novi Sad, Serbia**



- **Panakva, Novi Sad, Serbia**



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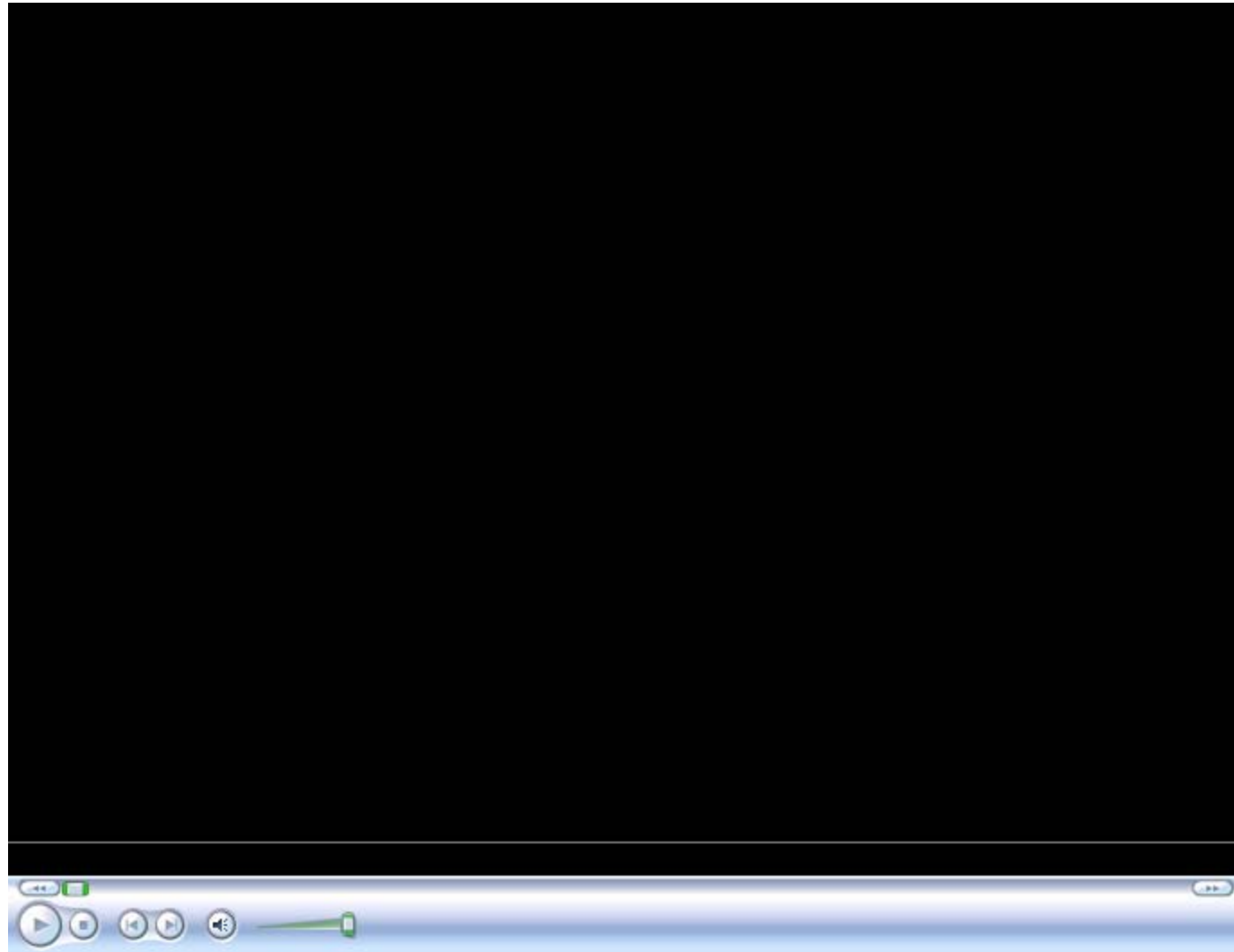
Equipment – fabrication facilities – flexible substrate:



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Wide range of new and exiting applications:



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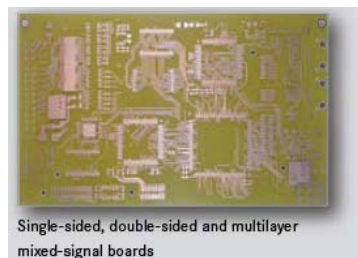
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Equipment – fabrication facilities – rigid substrate (PCB):

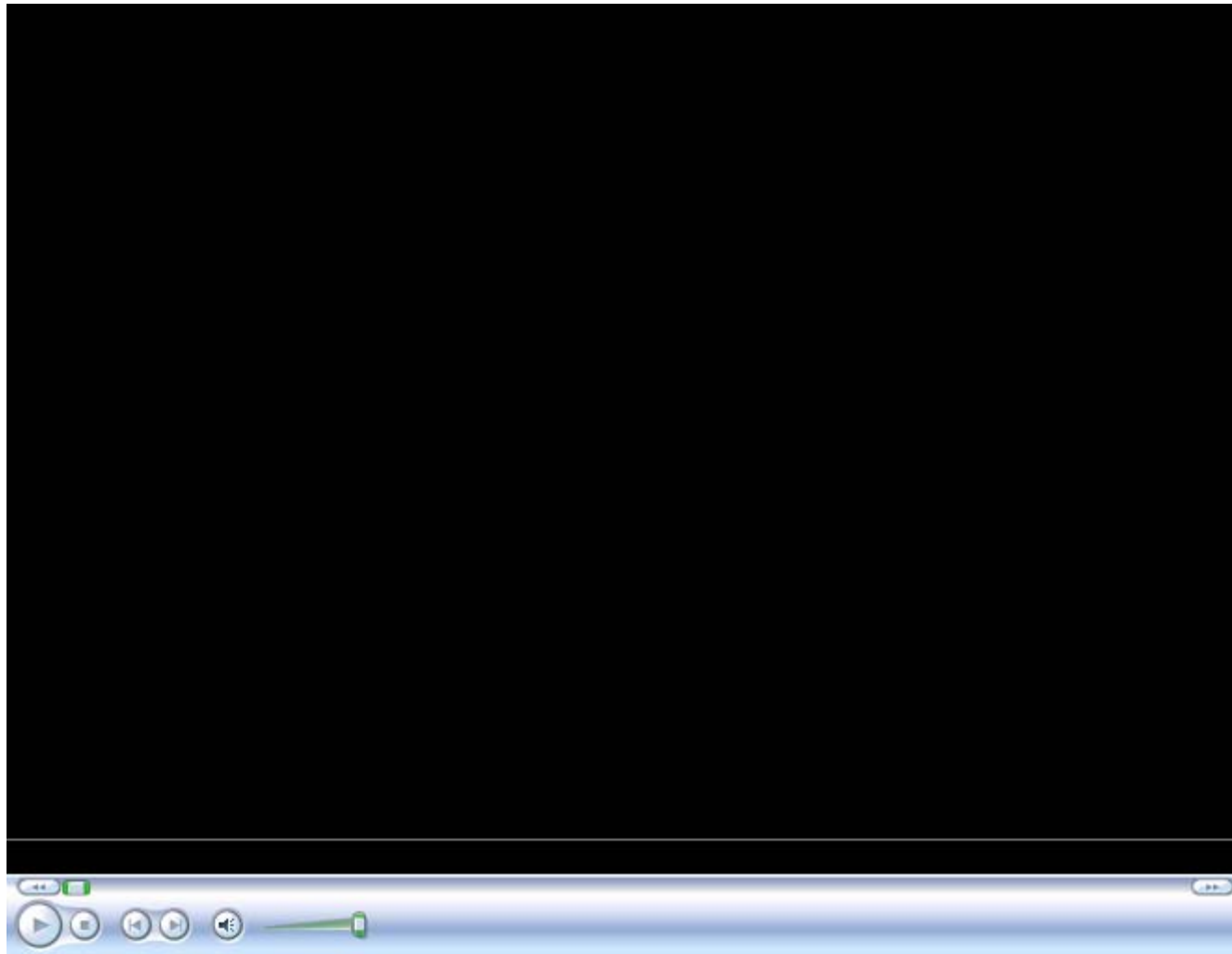


Applications



European Commission
TEMPUS

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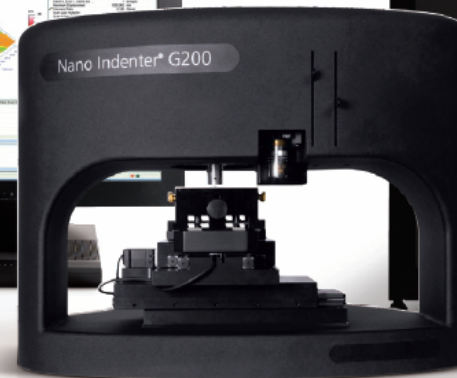
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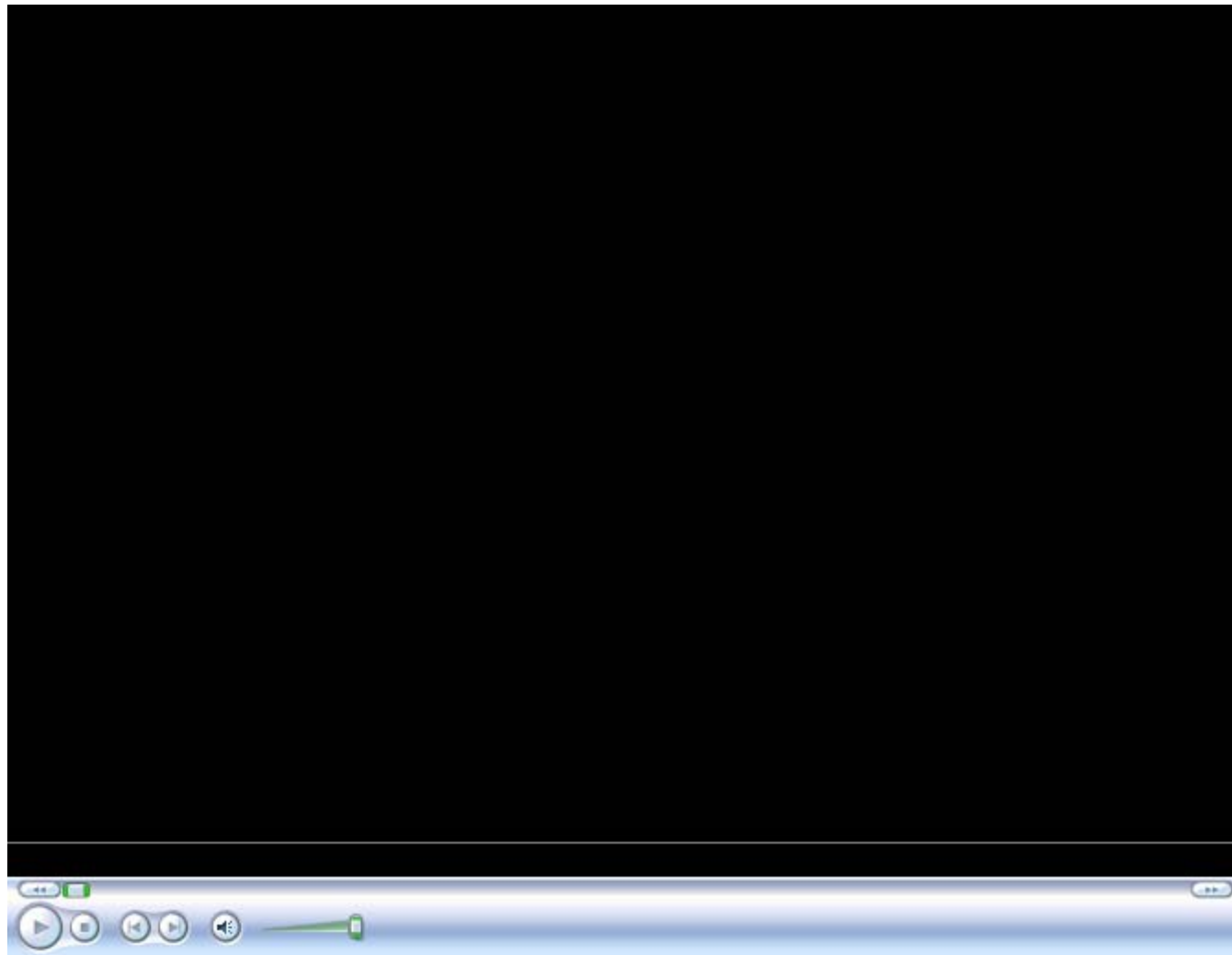
Some specific pieces of equipment for characterization:

- N5230A Agilent PNA-L Network Analyzer, 10MHz-50GHz
- E5071B Agilent Vector Network Analyzer, 300 kHz-8.5 GHz
- 4191A RF Impedance Analyzer, 1 MHz-1GHz
- 4194A Impedance/Gain Phase Analyzer, 100Hz-40MHz
- RF/Microwave Wafer Probe Station, SUSS PM5
- Hall Effect Measurement System HMS-3000
- Nanoindenter

- High performance computer cluster



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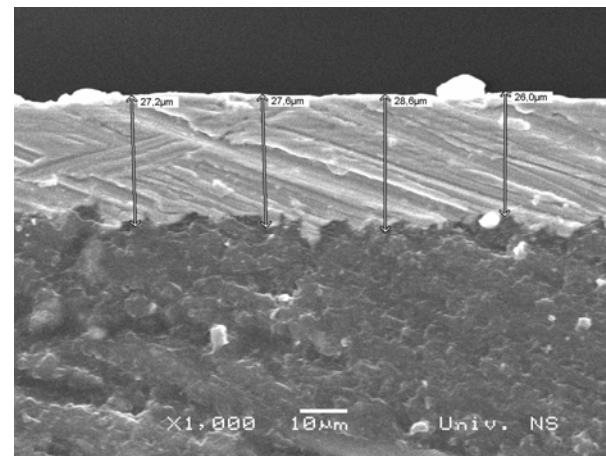
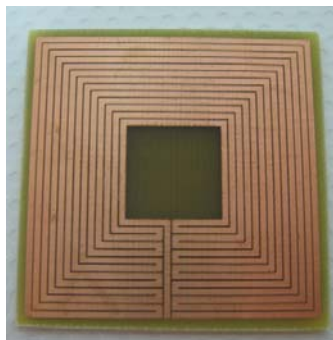
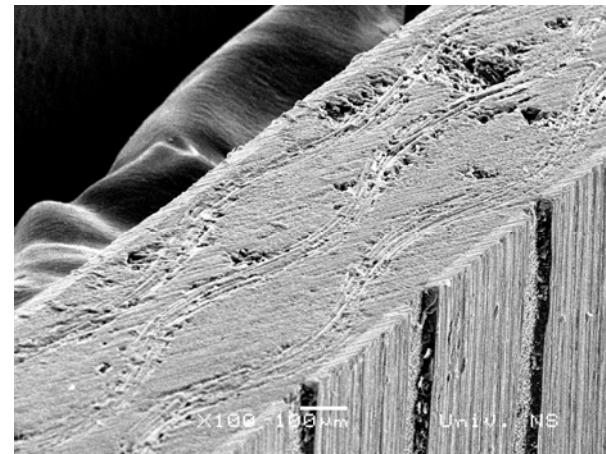
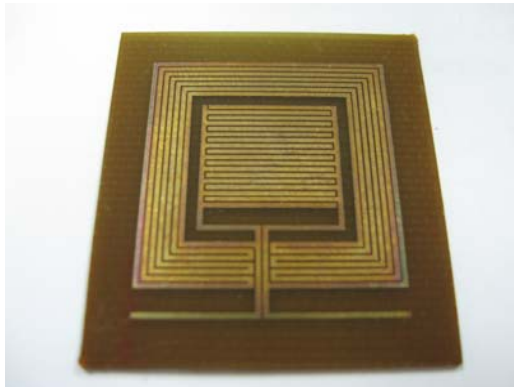
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Selected publications:

1. H. Liu, Veljko Malbaša, Ivan Mezei, A. Nayak, Ivan Stojmenović: “Coordination in Sensor, Actuator and Robot Networks”, In: *Wireless Sensor and Actuator Networks: Algorithms and Protocols for Scalable Coordination and Data Communication*, Wiley Blackwell, Jan. 2010, pp. 233-262.
2. Goran Stojanović, Milan Radovanović, Mirjana Malešev, Vlastimir Radonjanin, “Monitoring of Water Content in Building Materials Using a Wireless Passive Sensor”, *Sensors* (IF: 1.821), vol. 10, no. 5, pp. 4270-4280, 2010.
3. Mirjana Damnjanović, Ljiljana Živanov, Goran Stojanović, Aleksandar Menićanin, “Influence of Conductive Layer Geometry on Maximal Impedance Frequency Shift of Zig-Zag Ferrite EMI Suppressor”, *IEEE Transactions on Magnetics* (IF: 1.061), vol. 46, no. 6, pp. 1303-1306, 2010.
4. Goran Radosavljević, Ljiljana Živanov, Walter Smetana, Andrea Marić, Michael Unger, Laslo Nađ: A Wireless Embedded Resonant Pressure Sensor Fabricated in the Standard LTCC Technology, *IEEE Sensor Journal* (IF: 1.61), vol. 9, no. 12, pp. 1956-1962, 2009.
5. Rastislav Struharik, Ladislav Novak, “IP Core Implementation of Decision Trees”, *IET Computers and Digital Techniques* (IF: 0.629), vol. 3, no. 3, pp. 259-269, 2009.

Examples of our innovations in microelectronic components:

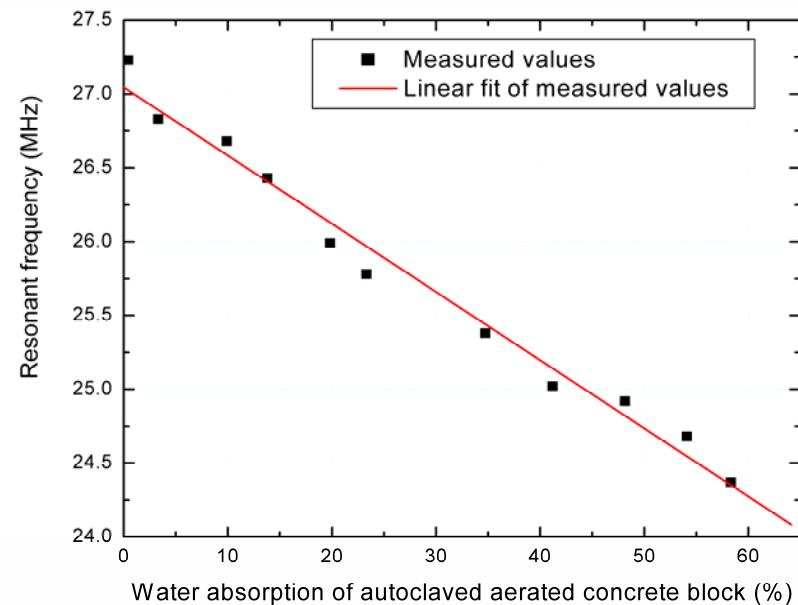
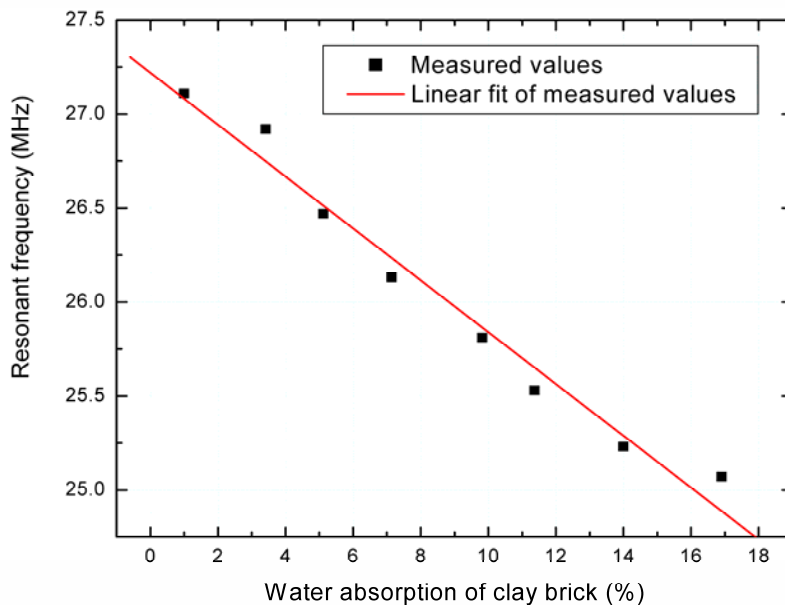
1a. WIRELESS LC SENSORS FOR MONITORING WATER CONTENT IN BUILDING MATERIALS - PCB



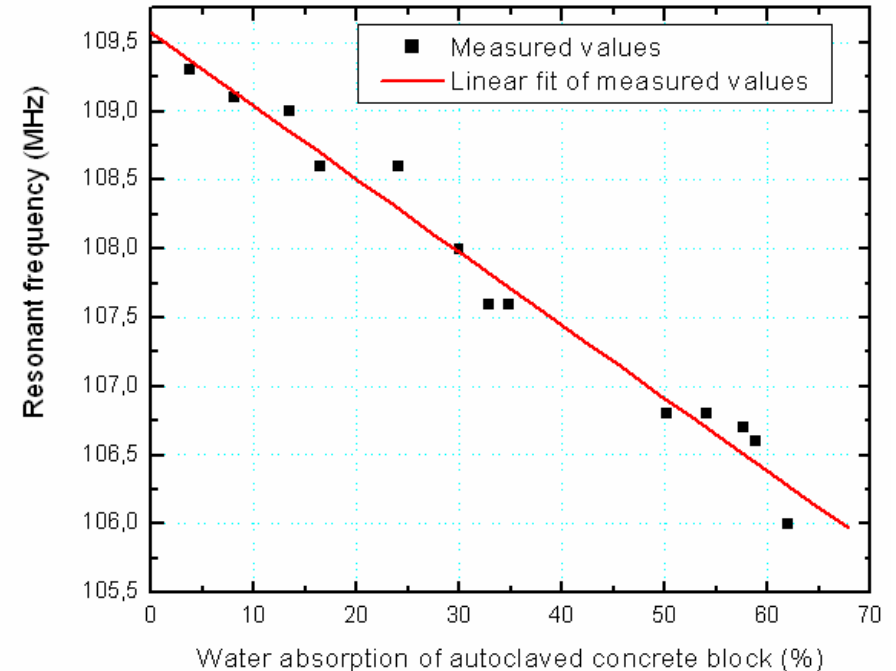
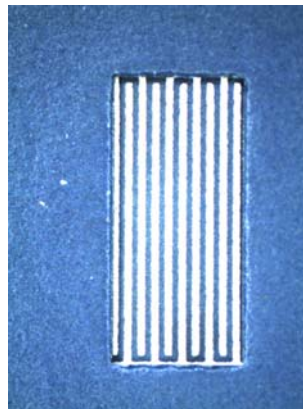
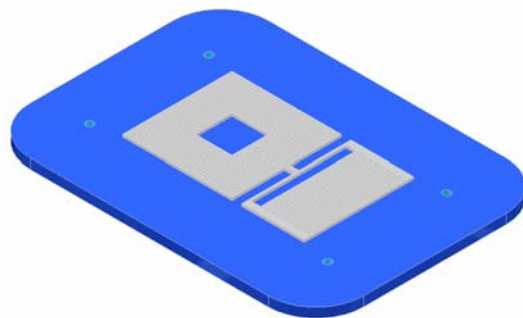
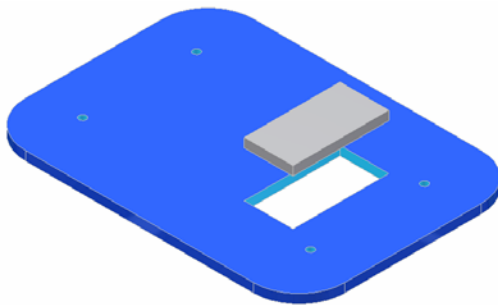
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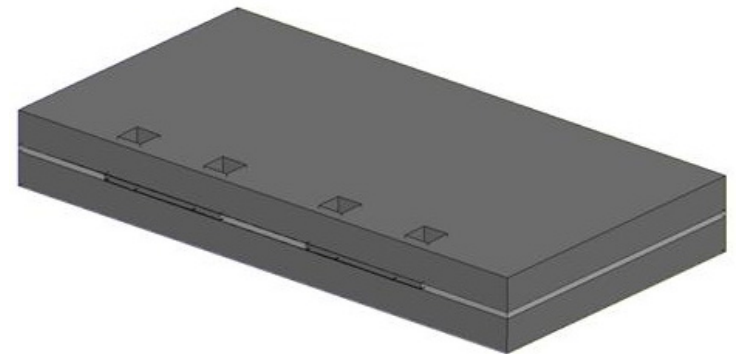
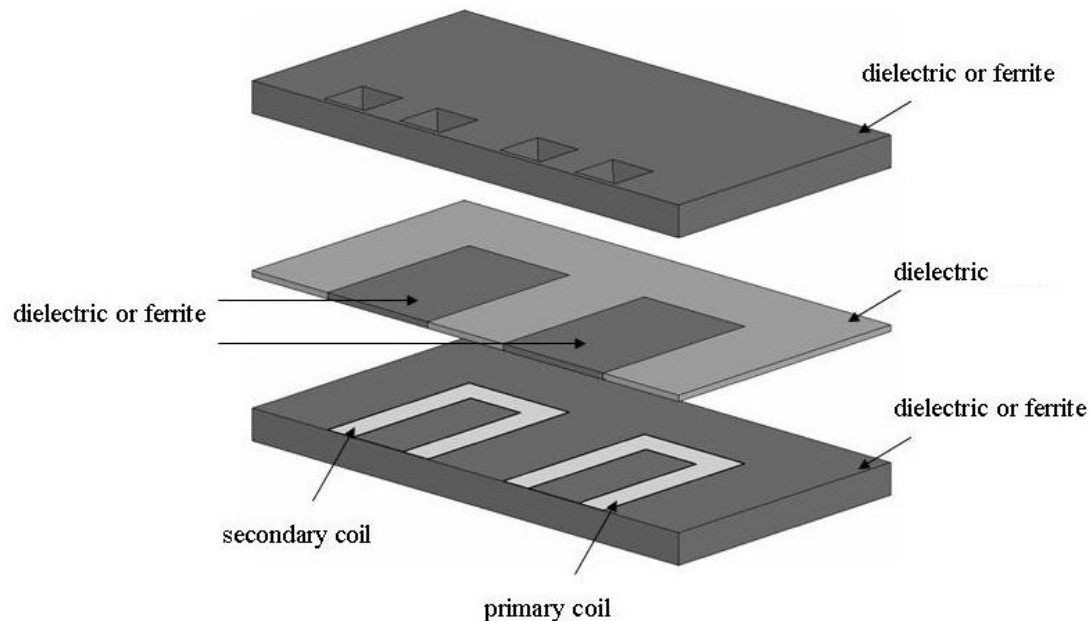


1b. WIRELESS LC SENSORS FOR MONITORING WATER CONTENT IN BUILDING MATERIALS - LTCC

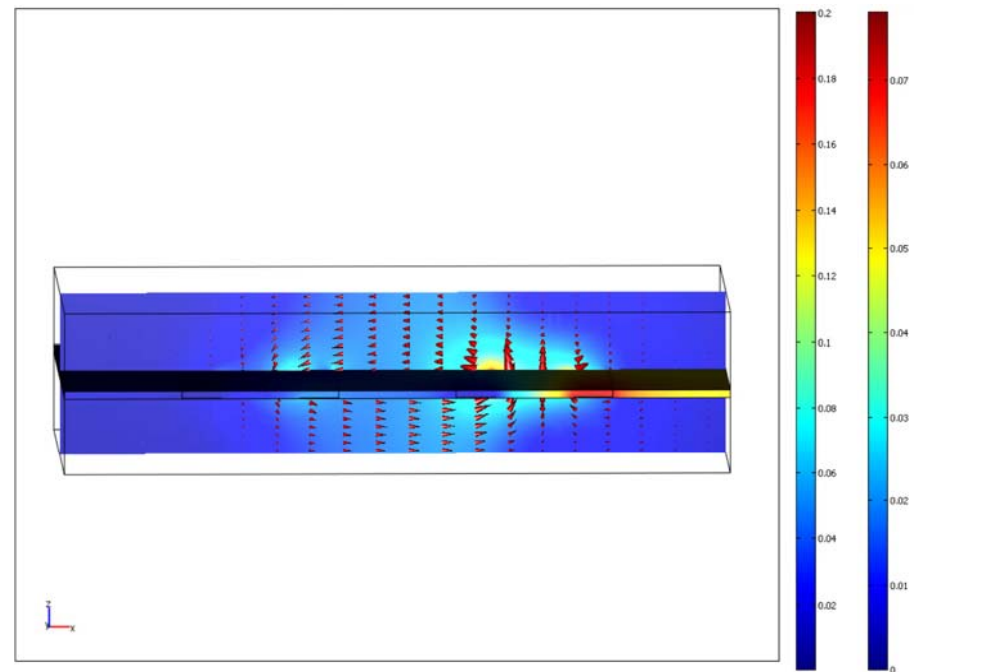
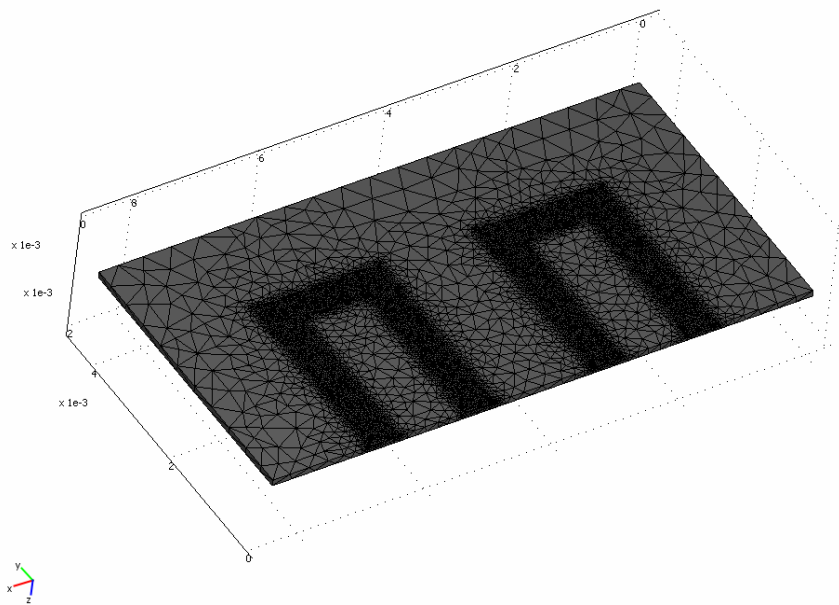


2. COMPACT MICROTRANSFORMER – LTCC TECHNOLOGY

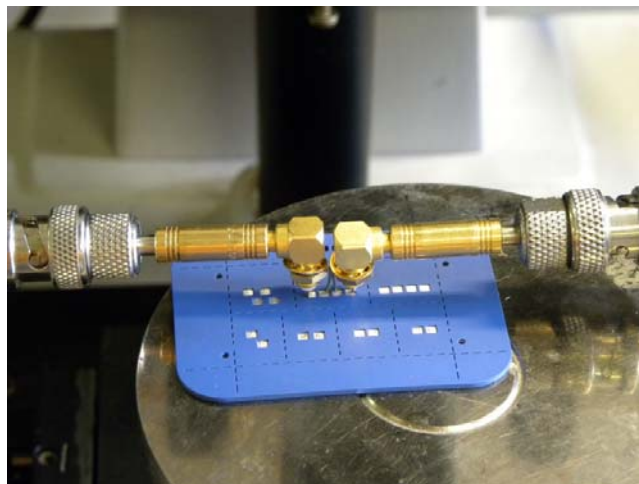
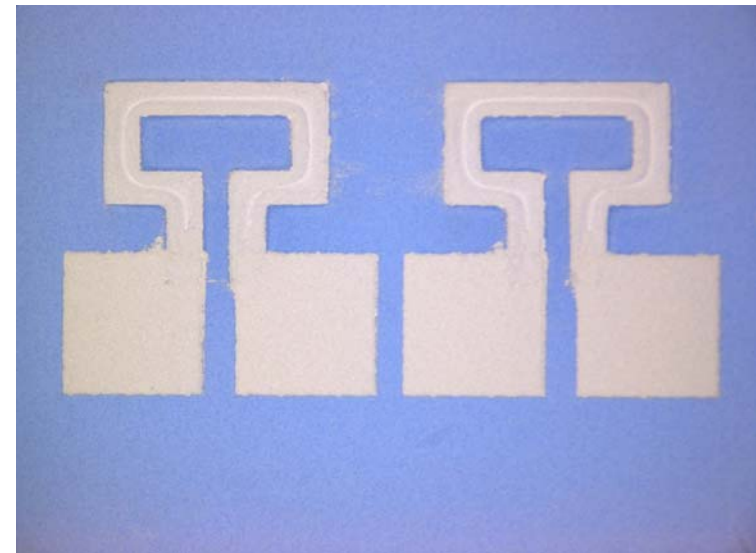
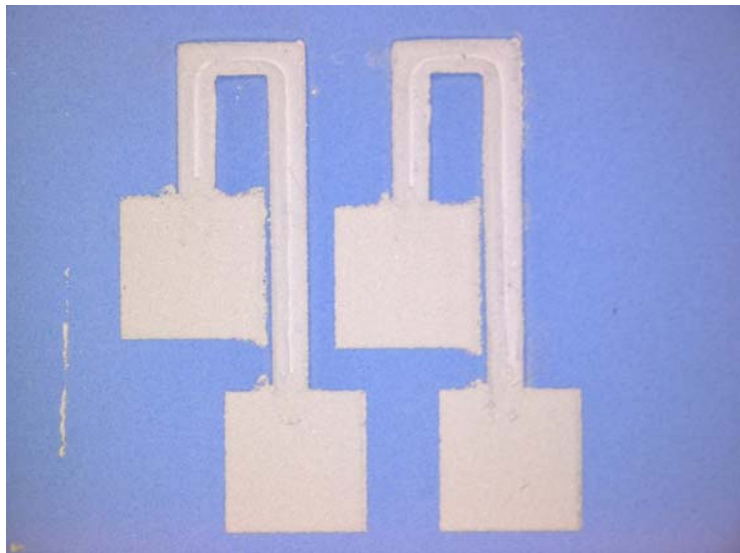
The integration of magnetic properties into existing dielectric LTCC structures would have a dramatic impact on the miniaturization and application potential of LTCC devices in modern electronics – DC/DC converters



As a first step COMSOL Multiphysics was used for performances analysis of the presented LTCC ferrite transformer

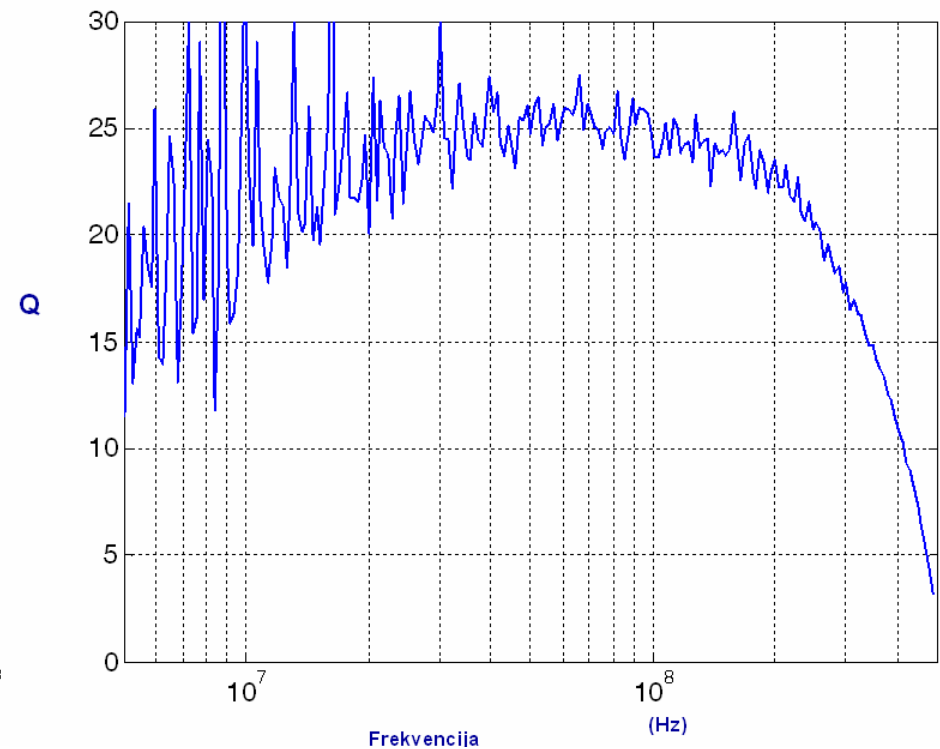
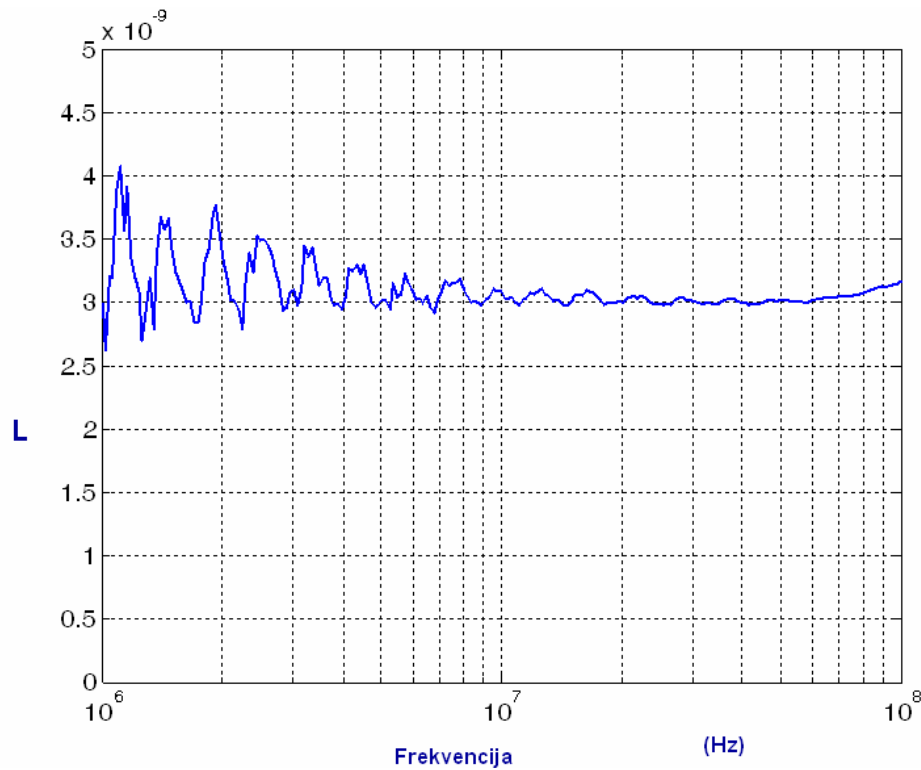


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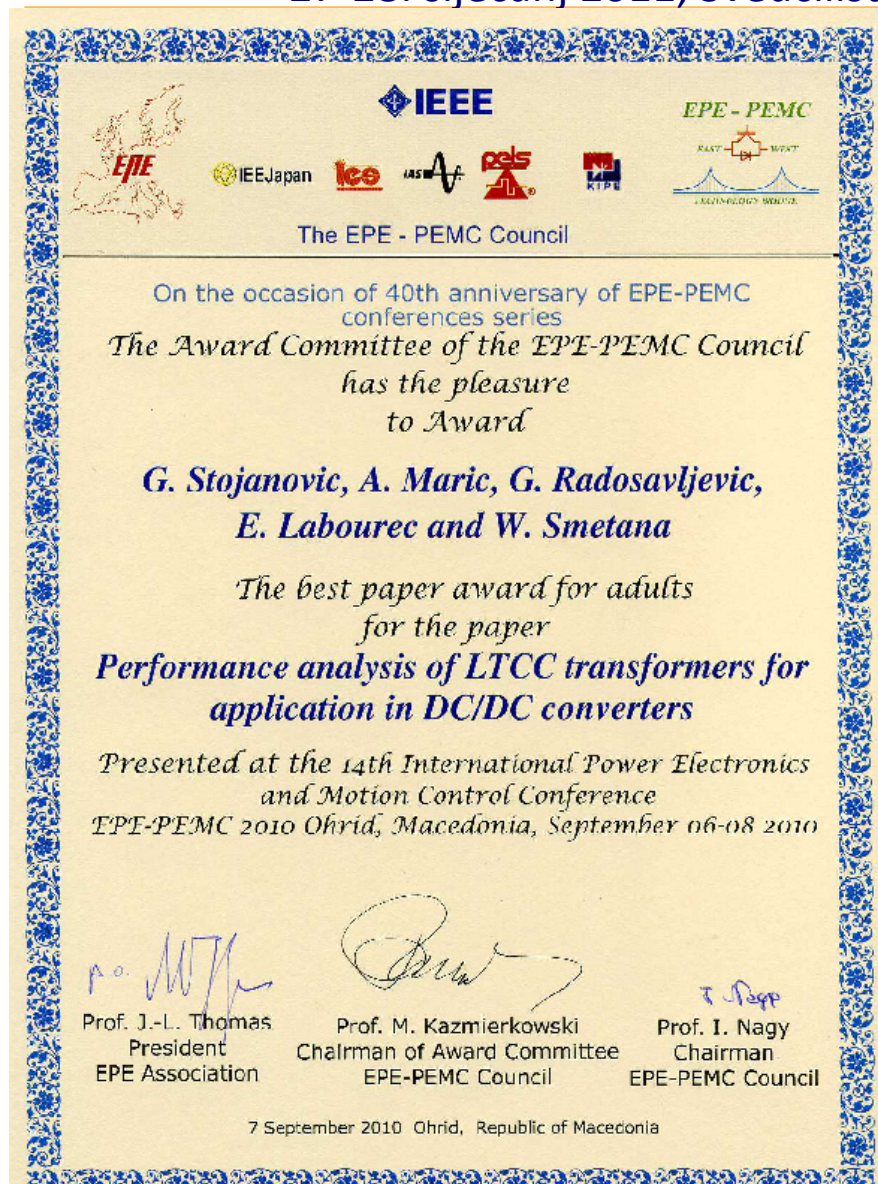
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