TECHNOLOGY OFFER

Ceramic tape for microwave LTCC substrates

Łukasiewicz
Institute of Microelectronics and Photonics

Who are we?

Łukasiewicz – Institute of Microelectronics and Photonics, based in Poland (Warsaw), is a part of Łukasiewicz Research Network - one of the largest European organizations for applied research. Łukasiewicz – IMiF operates under the formula Science is Business and its strategy is to play a central role in the innovation process towards R&D for industry and business. Our institute conducts research work in the areas of LTCC technology and printed electronics, integration of electronic components, as well as, circuit design, sensors for applications in medicine, environmental protection, photovoltaic installations, power systems and electrical energy storage. Our researchers are also involved in the fabrication and characterization of materials and ceramic and polymer composites for electronic applications.

Patent information

Technology readiness level: 7

Title: Ceramic tape for microwave LTCC substrates

Patent number: Pat.241887

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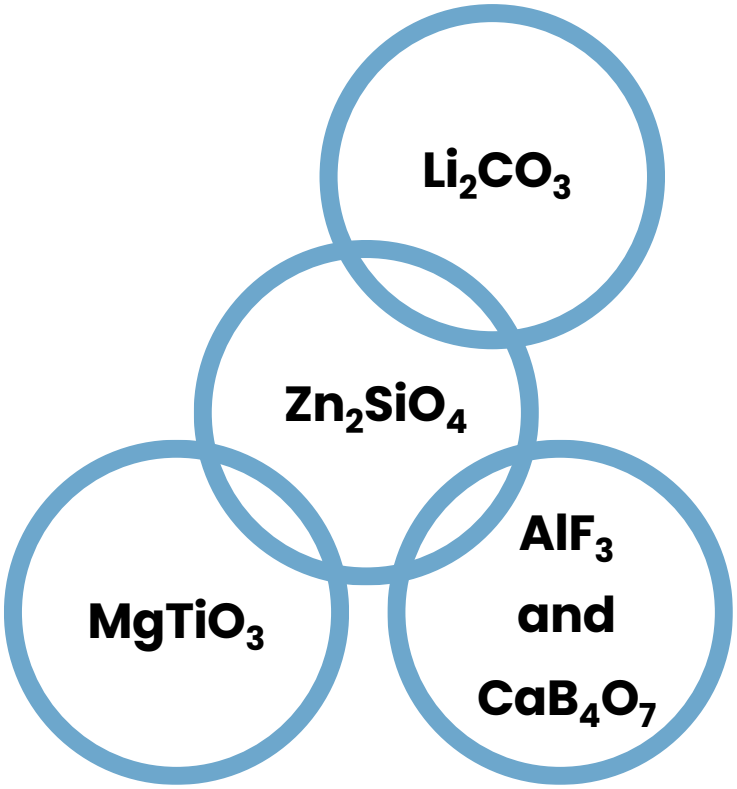
Inventors: Beata Synkiewicz – Musialska, Dorota Szwagierczak, Jan Kulawik

Owners: Łukasiewicz - IMiF

Jurisdictions: Poland

The subject of the invention is a ceramic tape for substrates and packages, produced by LTCC (Low Temperature Cofired Ceramics) technology. Our tape can be sintered at low temperatures (900-980°C) and exhibits low dielectric permittivity in the 1 kHz - 3 THz frequency after sintering.

Ceramic tape for microwave system substrates according to presented invention contains, after a sintering process, zinc silicate (Zn_2SiO_4) and magnesium titanate ($MgTiO_3$) or zinc silicate (Zn_2SiO_4) and lithium carbonate (Li_2CO_3) or zinc silicate (Zn_2SiO_4) and a mixture consisting of aluminum fluoride (AlF_3) and calcium borate (CaB_4O_7).



Technology Summary

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The potential behind the technology

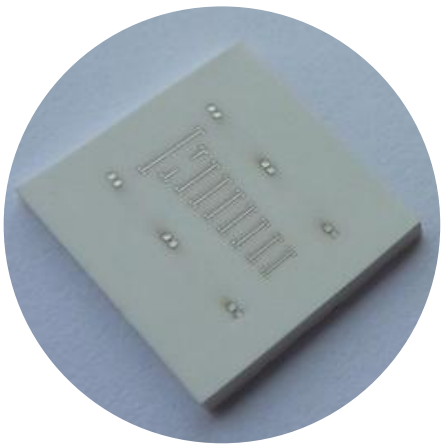
The ceramic tapes obtained according to the patent, show a low dielectric constant and a relatively low sintering temperature, making them a promising material for multilayer LTCC substrates for electronic circuits operating at very high frequencies. Thanks to our solution it can be possible to increase the speed of signal propagation, increase selectivity, reduce attenuation, and reduce power loss.

Technology Advantages

Our tape has a low sintering temperature of 900-980°C and no undesirable
Our tape has a low sintering temperature of 900-980°C and no undesirable reactivity with silver and silver-palladium pastes used for screen-printing of conductive layers. In the sintered state, it has a dielectric constant of 6.0-7.2 at 1 MHz in the temperature range from -30 to 150°C and a loss factor of less than 0.003. The dielectric constant at room temperature is 6.1-7.2 at 1 THz .

Application

Our solution can be applied in substrates and packages for microwave circuits mainly destined for wireless communications (i.e., in devices related to satellite broadcasting, ultra-high-speed local area network LANs, electronic transport cashing (ETC), in-vehicle collision avoidance systems (intelligent transport systems ITS, etc.) and in devices where very high frequencies are used.



Collaboration type

License agreement or sale agreement

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