

## Ceramic material for microwave circuit substrates

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### Who are we?

### Patent information

**Technology  
readiness  
level:**  
**7**

**Title:** Ceramic material for microwave circuit substrates

**Patent number:** Pat.241886

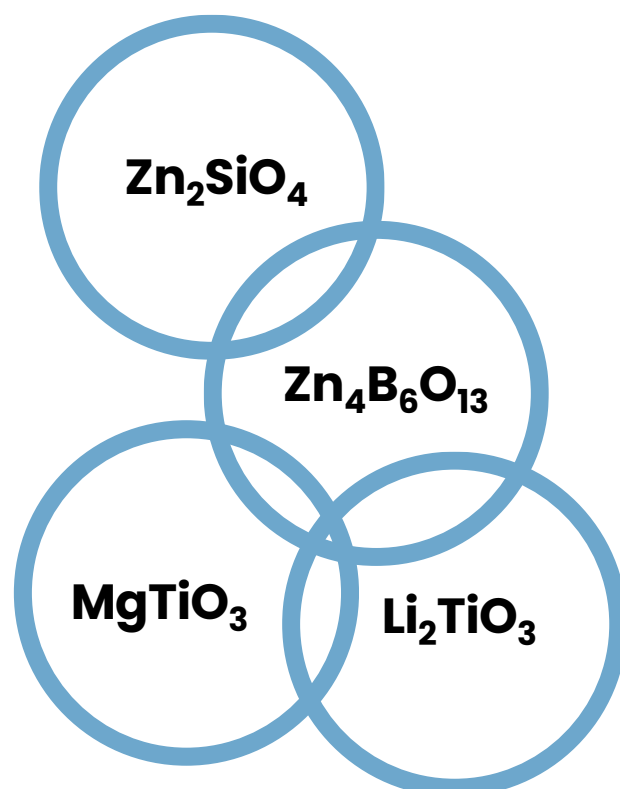
**Priority Date:** 9.03.2018

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

**Owners:** Łukasiewicz – IMiF

**Jurisdictions:** Poland

The subject of the invention is a ceramic for substrates of microwave systems. This ceramic is characterized by a low sintering temperature, compatibility with commercial silver-based conductive pastes and low dielectric permittivity over a wide frequency range, including terahertz frequencies. Due to its low sintering temperature, it can be used to fabricate substrates and packages using LTCC (Low Temperature Cofired Ceramics) technology.



### The potential behind the technology

The ceramic prepared by the patented method contains  $\text{Zn}_4\text{B}_6\text{O}_{13}$  as the main component determining the dielectric properties, and additions of one or two compounds from the group of  $\text{Zn}_2\text{SiO}_4$ ,  $\text{Li}_2\text{TiO}_3$ ,  $\text{MgTiO}_3$ , so that it is possible to achieve a widening and stabilization of the sintering temperature range and to achieve small absolute values of the temperature coefficient of resonant frequency.

### Technology Advantages

Ceramic according to the invention is characterized by a low sintering temperature of 880–960°C, a dielectric constant of 5.1–7.9 and a loss factor of 0.001–0.003 at 1 MHz, and compatibility with silver and silver–palladium pastes used in thick film technology. What is more, the ceramic exhibits a low dielectric permittivity of 5.8–7.8 for 1 THz.

### Application

Presented solution can be used to make ceramic substrates and packages for microwave circuits by pressing and sintering, or used to make ceramic tapes for multilayer LTCC substrates co-sintered with conductive layers.



### Collaboration type

License agreement or sale agreement

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**Łukasiewicz Research Network – Institute of Microelectronics and Photonics**  
al. Lotników 32/46, 02-668 Warsaw



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