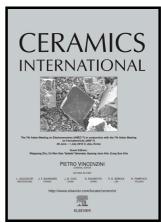
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www.elsevier.com/locate/ceri

PII: S0272-8842(18)31144-1

DOI: https://doi.org/10.1016/j.ceramint.2018.05.014

Reference: CERI18189

To appear in: Ceramics International

Received date: 12 March 2018 Revised date: 25 April 2018 Accepted date: 3 May 2018

Cite this article as: Zhangzhao Weng, Zhengyu Han, Fen Xiao, Hao Xue and Dongliang Peng, Low temperature sintering and microwave dielectric properties of Zn_{1.8}SiO_{3.8} ceramics with BaCu(B₂O₅) additive for LTCC applications, *Ceramics International*, https://doi.org/10.1016/j.ceramint.2018.05.014

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ACCEPTED MANUSCRIPT

Low temperature sintering and microwave dielectric properties of $Zn_{1.8}SiO_{3.8}$ ceramics with $BaCu(B_2O_5)$ additive for LTCC applications

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Abstract

The Zn_{1.8}SiO_{3.8} (ZS) ceramics with BaCu(B₂O₅) (BCB) additive were synthesized by the conventional solid-state reaction route and the effect of BCB additive on the microwave dielectric properties of the ceramics was investigated. The results demonstrate that BCB could effectively decrease the sintering temperature from 1300 °C to 930 °C and does not induce obviously degradation of the microwave dielectric properties. The 6.wt% BCB added ZS ceramics exhibited a low sintering temperature (~930 °C) and excellent dielectric properties of $\varepsilon_r = 6.79$, $Q \times f = 33,648$ GHz, and $\tau_f = -30$ ppm/°C. To compensate the negative τ_f value of this system, TiO₂ powders were introduced. Particularly when 10.wt% TiO₂ was added, good microwave dielectric properties of $\varepsilon_r = 8.175$, $Q \times f = 21,252$ GHz, and $\tau_f = 1.2$ ppm/°C were obtained for the 6.wt% BCB added ZS ceramic sintered at 930 °C for 3h. Moreover, BCB added ZS-TiO₂ ceramics have a chemical compatibility with silver, which indicate that the BCB added ZS ceramics are promising candidate for LTCC

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