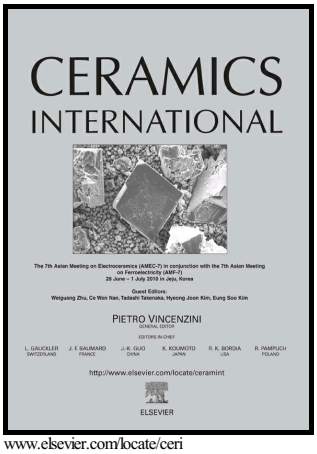

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Low temperature sintering and microwave dielectric properties of $Zn_{1.8}SiO_{3.8}$ ceramics with $BaCu(B_2O_5)$ additive for LTCC applications

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Abstract

The $Zn_{1.8}SiO_{3.8}$ (ZS) ceramics with $BaCu(B_2O_5)$ (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 ºC) and excellent dielectric properties of ε_r = 6.79, $Q\times f$ = 33,648 GHz, and τ_f =-30 ppm/°C. To compensate the negative τ_f value of this system, TiO_2 powders were introduced. Particularly when 10.wt% TiO_2 was added, good microwave dielectric properties of ε_r=8.175, $Q\times f$=21,252 GHz, and τ_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-TiO_2 ceramics have a chemical compatibility with silver, which indicate that the BCB added ZS ceramics are promising candidate for LTCC