New LTCC composites based on $BaMoO_4$ and $BiCu_3Ti_3FeO_{12}$ for use as potential radiofrequency devices

F. A. C. Nobrega [1], R. F. Abreu [2], D. B. Freitas [2], A. J. M. Sales [4,*], J. P. C do Nascimento [3], A. S. B. Sombra [2,4]

[1]Department of Organic and Inorganic Chemistry, Science Center, Federal University of Ceará (UFC), Brazil.
[2]Telecommunication Engineering Department, Federal University of Ceará (UFC), Fortaleza, Ceará, 60755-640, Brazil.
[3]Federal Institute of Education, Science and Technology of Ceará, PPGET, Fortaleza, Ceará, Brazil.
[4]LOCEM-Telecommunication and Materials Science and Engineering of Laboratory (LOCEM), Physics Department, Federal University of Ceara (UFC), Campus PICI, P.O. Box 6030, Fortaleza, Ceará, 60455-760, Brazil.
*e-mail: jeffsales.brasil@gmail.com

Electro ceramics are used as electronic devices, and currently, $BaMoO_4$ is synthesized and used as electrode material [1]. Another ceramic that stands out with dielectric properties is $BiCu_3Ti_3FeO_{12}$ because it exhibits a high permittivity value ε_r = 230.88 in the microwave region [2]. Currently, research is producing electro ceramics at low sintering temperatures – LTCC for application in electronic devices. Recently, electro ceramics are used in the radiofrequency region [3], because in this region the devices operate in millimeter waves and are widely used in telecommunications and energy flow controllers. However, in this work new ceramic composites (1-x) $BaMoO_4$ – (x) $BiCu3Ti_3FeO_{12}$ were synthesized by solid-state reaction for application in radiofrequency. With the results, the formation of the $BaMoO_4$ phase was characterized by X-ray diffraction and vibrational RAMAN spectroscopy, analyzing the composite (1-x) $BaMoO_4$ - (x) $BiCu_3Ti_3FeO_{12}$ the scanning electron microscopy demonstrated that its grains present homogeneous structures. In radiofrequency, the composites presented a permittivity value above 100, a TCC Capacitance Temperature Coefficient value close to zero in the frequency range from 100 kHz to 1 MHz, and conductivity corresponding to semiconductor materials. It is concluded that the composites (1-x) $BaMoO_4$ – (x) $BiCu_3Ti_3FeO_{12}$ can be synthesized by solid-state reaction and become potential semiconductor devices for radiofrequency application.

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