

Study of the dielectric properties of SrBi₂Nb₂O₉ (SBN) ceramic matrix with bulk addition of CaTiO₃ (CTO).

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This study shows the dielectric properties in the radio frequency (RF) and microwave (MW) regions of SrBi₂Nb₂O₉ (SBN) ceramics with mass addition of 45, 50, 55, 60 and 65% CaTiO₃ (CTO). The sample was manufactured by solid state reaction. For crystal structure analysis of the ceramics we performed X-ray diffraction (XRD) method and Rietveld refinement. This technique was fundamental to determine the phases present in our crystal structures of the SBN matrix with CTO addition. We performed complex impedance spectroscopy at different temperatures, where we obtained the permittivity values of approximately ($\epsilon_r = 27$), loss tangent ($\tan \delta = 3.69 \times 10^{-2}$) and conductivity characteristic of the ceramic materials. Using equivalent circuits with R-CPE associations, it was possible to obtain the Nyquist diagram and determine the reaction activation energy in the ceramic matrix. The data obtained indicate that the samples have interesting properties for applications in devices operating in the MW region, particularly in the "S" band (2.0 - 4.0 GHz). The applications are diverse: satellite communication, weather radar, telemetry and remote monitoring.

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