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Title

Microwave properties of Ba(Zn sub(1/3)Ta sub(2/3))O sub(3) dielectric resonators

Source

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Abstract

Ba(Zn sub(1/3)Ta sub(2/3))O (BZT) dielectric resonators were prepared by solid-state reaction. The starting materials were BaCO sub(3), ZnO, and Ta sub(2)O sub(5) powders with high purity. The double calcined BZT pellets were sintered in air at temperatures of 1575, 1600, 1625, and 1650degreeC for 4 h. The X-ray diffraction data allowed the study of the unit cell distortion degree and the presence of the secondary phases. A long-range order with a 2:1 ratio of Ta and Zn cations on the octahedral positions of the perovskite structure was observed with the increase of the sintering temperature. The dielectric constant of BZT resonators measured around 6 GHz was between 26 and 28. High values of Q x f product (120 THz) were obtained for BZT resonators sintered at 1650degreeC/4 h. The temperature coefficient of the resonance frequency exhibits positive values less than 6 ppm/degreeC. The achieved dielectric parameters recommend BZT dielectric resonators for microwave and millimeter wave applications. [All rights reserved Elsevier]. (25 References).