515
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Title:Microstructures and Microwave Dielectric Properties of (Mg1-xSrx)(2)Al4Si5O18 Ceramics
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Abstract:(Mg1-xSrx)(2)Al4Si5O8 ceramics were fabricated by traditional ceramic sintering method. The phase transformation from beta-Mg2Al4Si5O18 to alpha-Mg2Al4Si5O18 was accelerated and the width of sihtering range was boarded due to Sr ions doping. The XRD patterns show that the cordierite solid solution of (Mg,Sr)(2)Al4Si5O18 is kept in the range of 0 <= x<0.2, and the feldspar solid solution of (Sr,Mg)Al2Si2O8 is kept in the range of 0.6<x <= 1.0. Meanwhile, the change of feldspar's crystal cell volumes complies with Vegard's rules. SEM images show that the porosity and microcracks of cordierite ceramics are well suppressed due to Sr doping. The growth and distribution of feldspar particles are promoted. The dielectric constants of (Mg1-xSrx)(2)Al4Si5O8 ceramics keep at vicinity of 7.0 in the range of 0 <= x <= 0.4, then increase to 8.5 at the range of 0.6 <= x <= 1.0. The quality factors (Q(f) values) evidently increase from 24100 G1-1z at x=0 to 38900 GHz at x=0.2, then decrease continually to 14500 GHz at x=1.0.
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