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Heat-treatment Effect on Z-type Hexaferrite for RF Device Application

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The Z-type hexaferrite $Ba_{1.5}Sr_{1.5}Co_2Fe_{24}O_{41}$ was synthesized by using a solid state reaction method under various heat-treatment conditions. The crystal structure and magnetic properties at high frequency were characterized by on x-ray diffractometer, network analyzer, vibrating sample magnetometer, and Mössbauer spectrometer. The $Ba_{1.5}Sr_{1.5}Co_2Fe_{24}O_{41}$ samples prepared by using the step calcination (SC12) process showed the considerably improved permeability and magnetic loss compared to those prepared by using the other processes due to the complete formation of Z-type phase from the calcination. When Co_2Z sample prepared by using SC12 process was sintered at 1125 °C and cooled at a slow rate, the value of magnetic loss $\tan\delta_\mu$ remained below 0.1 up to 750 MHz, and at 750 MHz, the values of permeability, permittivity, and dielectric loss were $\mu' = 7.9$, $\varepsilon' = 10.9$, and $\tan\delta_\varepsilon = 0.01$, respectively.

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