Hexagonal high electrical resistivity, excellent dielectric losses,

Psychology, Behaviorism

Hexagonal ferritesmaterials are metal oxides that exhibit high saturation magnetization, high/lowcoercivity, high electrical resistivity, excellent dielectric losses, highpermittivity and permeability 1. Hexa-ferrites are very attractive materialsfor technological applications due to their unique electrical and magneticproperties. Hexagonal ferrites have many applications, such as recording, magneto-optical devices, and permanent magnets. Its unique magneto-dielectricproperty is particularly interesting in microwave and radio frequency applications 3. Dielectriccharacteristic is an important property of hexagonal ferrites which depends ondifferent factors like polarization, sintering temperature and time, frequency, method of preparation, 5 and kind of charge carrier 6. Composition, temperature 7 and substituted ordoped8 badly effect the electrical properties of hexagonal ferrites. So, a littlechange in composition, can transform material from insulator to semiconductor9.

Hexagonalferrites are of different types i. e.(SrFe12O19), W(SrM2Fe16O27), X(Sr2M2Fe28O46, Y(Sr2M2Fe12O22), Z(Sr3M2Fe24O41), U(Sr4M2Fe36O60), and R(SrM2Fe4O11)10. where M = a small 2+ ion such as cobalt, nickelor zinc. R-typehexagonal ferrites have hexagonal structure and represented as RR* where R is Rblock and R* has the phase shift of 1800 11. Thereare a lot of methods to synthesize but sol-gel is low cost and easy method. Therefore, sol-gel technique is used to synthesize the single phase of R-typehexagonal (SrM2Fe4O11) where ‘ M’ istetravalent element. The need of using tetravalent element is to maintain theoverall neutrality of the sample.

Maria et al synthesizedstrontium-barium X-type hexagonal ferrites with composition SrBaCu2? xNixNdyFe28? yO46(x = 0, 0. 2, 0. 4, 0. 6, 0. 8, 1 and y= 0, 0. 02, 0.

04, 0. 06, 0. 08, 0. 1) by sol-gel method. The XRD analysis revealsthe single phase for all the samples. Doping of Nd-Ni, the trend of dielectricconstant, dielectric loss and AC-conductivity showed decreasing.

The Cole-Coleplots revealed grain boundary contribution. The appearance of singlesemi-circle in impedance, the exceptional role of grain boundaries in theconduction process con? rmed by Cole-Cole graphs. The lower dielectricparameters of studied nano X-type ferrites propose their possibility forhigh-frequency applications i.

e. phase shifters, dielectric resonators, etc. Long et al synthesizedSr-hexaferrites with series of Sr1-xLaxFe12-xZnxO19(x= 0–0. 3) with Bi2O3 chemical by microwave sinteringmethod at low sintering temperatures. In this work, crystal structure, magnetic, electrical, and dielectric properties were studied.

These properties indicates that the La3+-Zn2+ions can partially substitute the Sr2+-Fe3+ ions withx? 0. 2 for the low temperature sintered Sr1-xLaxFe12-xZnxO19(x= 0–0. 3) hexa-ferrites. The dielectric behavior of the Sr1-xLaxFe12-xZnxO19(x= 0–0. 2) ferrites is found to obey the space charge polarization mechanismfrom the typical current-voltage (I-V) curves and polarization versus electric? eld (P-E) loop.