

TOT of “Microwave absorbing Spinel Ferrite powder (MWA-NSF)”

Ferrites constitute an important group of magnetic materials with a wide range of applications due to their tuneable magnetic and dielectric properties based on their composition and structures. The different classes of ferrites show different types of magnetic properties and as a consequence they interact differently with different frequencies of EM spectrum. The properties of ferrites can be tailored to show very low to very high absorption of high frequency electromagnetic radiations. The ferrites which absorb energy from electromagnetic waves are widely used in reduction of Radar Cross Section of any target.

In general, ferrites show resonance over a very narrow band of frequencies. Thus in order to achieve high values of MW absorption over broad frequency range, there is a need to develop a range of ferrites covering broad range of MW frequencies. Spinel ferrite shows high magnetic losses at low microwave frequencies. The resonance absorption frequencies of the ferrites can be tailored by variation of composition of ferrites as well as by varying the size and shape of particles.

Defence Laboratory, Jodhpur has developed microwave absorbing spinel ferrite powder for the development of various stealth products in the form of elastomeric sheets, structures and coatings for low frequency absorption 1-8GHz. Technology for bulk production of the ferrite powder established through wet chemical process in 10kg batch scale. The ferrite powder is currently being used for the fabrication of Microwave Absorbing rubber gasket (MWAR) of special shape and size for airborne application. The developed MWAR gasket has been qualified for its production for land and air version of military target. The requirement projected for 500 missiles in next three years.

Keeping in view of above requirements, it is proposed to explore the possibilities of transfer of ferrite powder technology to Indian industries for bulk production.

Preparation:

DLJ developed spinel ferrite can be prepared by following process:

1. Chemical reaction for gel to carbonate precipitation in water medium
2. Separation of precipitate & washing of chloride ions
3. Drying and crushing of powder
4. Crushing and sieving of powder
5. Three stage heat treatment processes at high temperature in furnace