# Abstract

The use of electromagnetic waves in the gigahertz range in wireless communication tools, local area networks, other communication equipments etc. is increasing day by day. In recent years, electromagnetic interference is a major headache mainly in civil and military applications due to increased usage of electromagnetic wave devices. To overcome this problem, a class of materials are used which have strong electromagnetic wave absorbing properties. The absorbers attenuate the electromagnetic energy through its dielectric or magnetic loss. In the present work, we have motivated on the development of electromagnetic wave absorbing materials mainly for military purposes. Reduction of radar signature of military platforms is a challenging issue during the Second World War. The main goal is that the development of excellent radar absorbing materials (RAMs) with light weight, smaller thicknesses that absorb strong microwave radiation over a wide frequency range. These types of materials are used to minimize the electromagnetic reflection from metal surfaces such as aircrafts, ships, tanks, etc.

Different types of magnetic materials such as ferrites, magnetite, hematite, etc. and dielectric materials such as barium titanate, lead zirconium titanate, barium strontium titanate, zinc oxide etc. are extensively used to develop radar absorbing materials. Magnetic material such as spinel type compound are widely applied as absorbing materials because of their high specific resistance, remarkable flexibility in tailoring the magnetic properties and ease of preparation. Recently, it has been shown that magnetic nanocomposites are used as absorbing materials due to their advantages in respect to light weight, low cost and better microwave properties over pure ferrites. Low densities, electrical conductivity, thermal and chemical stability of CNTs are attributed to the dielectric loss of target materials. Conducting polymers such as polyaniline, polypyrrole are also used for this purpose. Composites, prepared by two or more materials with a definite combination show enhanced properties that are not found in the individual component. Our developed composite materials have great potential and valuable applications in microwave absorption field.



***Keywords:*** *Ferroelectric material; Ferromagnetic material; SWCNTs; Polyaniline, polypyrrole; Return loss; Complex relative permittivity and permeability;*