National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: PHASE FORMATION, MICROSTRUCTURE, AND MAGNETOCAPACITANCE BEHAVIOUR OF EX-SITU COMBUSTION DERIVED MAGNETODIELECTRIC COMPOSITES
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Venue	: Seminar Room, Department of Ceramic Engineering
Date and Time	: 30 Nov 2023 (05:00 pm)
Abstract	: Magnetodielectric (MD) compounds belong to multifunctional materials which can show both magnetic and dielectric along with MD properties including magnetocapacitance (MC) and magnetoresistance (MR). MD properties depend on the interface of both dielectric and magnetic phases of the composite. In this work, a novel combustion derived ex-situ synthesis was adopted to develop MD composites. Here, one of the phases in the calcined powder form was dispersed in precursor of other phase followed by combustion. In this approach, by interchanging the dispersed (varying particle size) and precursor can alter the microstructure during sintering, and it can tune MD properties of the composites. Based on this concept, the prime objective of this research work is to develop ferrite-BT and BT-ferrite composites via ex-situ combustion in which the gel-combustion/solid-state derived calcined powders of dispersed phase (i.e., 30 wt % ferrite / 70 wt % BT in ferrite-BT / BT-ferrite composite, respectively) were introduced into the precursor to tune the microstructure (in terms of the distribution of BT, CF and in-situ phases) and explore the dielectric, magnetic and frequency/field dependent MC and MR of these composites. The results of all composites are analysed with respect to the type/interchanging dispersed phase, in-situ phases, microstructure, sintering temperature, density, resistivity, MC and MR and also compared with the relevant literature. The developed MD composite may have a potential application in the field of magnetoresistive sensors, actuators, transducers, spintronic devices, and memory devices.