National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Substituted Sr-hexaferrites: Unravelling the magnetic and microwave (26.5 – 40 GHz) properties for potential applications
Speaker	: Anupama Pati (Rollno : 519ph1007)
Supervisor	: Suryanarayan Dash
Venue	: Seminar Room (MC-126), Dept. of Physics and Astronomy
Date and Time	: 24 Jun 2025 (11:00 AM)
Abstract	: M-type strontium hexaferrites ($SrF_{12}O_{19}$) are in lime lights owing to their versatility and potentiality to improve the lives of mankind. These materials play an important role for their diversified applications such as permanent magnet materials, storage devices, and microwave absorbing materials and so on. However, properties of pure strontium hexaferrites are not substantial to fulfil the scientific demand. Substitution on either site of Sr-hexaferrite is beneficial to improve its various physical properties. Again, owing to a complex hexagonal magneto-plumbite crystal structure, the underlying mechanisms behind various physical properties are still in confusion. In this endeavor, this thesis work focuses on providing indirect experimental confirmation of superparamagnetic behaviour near transition temperature (470 ^{o}C). Furthermore, the effect of rare earth(Sm) and transition metal substitution (Mn) on either site of Sr-hexaferrites for magnetic and microwave absorption (Ka-band) is systematically analyzed. The structural, morphology, surface chemical studies are carried out using XRD, FESEM and XPS techniques. Mossbauer analysis is performed using 57Fe Mossbauer spectroscopy. Both temperature and field dependent magnetic measurements are carried out using VSM. Electromagnetic and Microwave absorption properties are studied using VNA instrument.