National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Morphology and emission behavior of the optimized Ce/Mn-YAG powder-based flexible and foldable luminescent PVDF film
Speaker	: Ranu Jena (Rollno : 523cr1001)
Supervisor	: Bibhuti Bhusan Nayak
Venue	: Department CR- Seminar Room
Date and Time	: 08 Oct 2025 (11:00 AM)
Abstract	: This work explores the morphology and emission behavior of a flexible and foldable Ce and Mn-YAG-based PVDF film, which may be helpful in different luminescent applications. To develop the individual Ce and Mn-YAG-based PVDF film, the various concentrations of Ce and Mn-doped YAG powders were first synthesized individually using a precipitation method and further calcined at 1400 °C for 1h. For Ce-doped samples, the primary YAG phase was obtained along with prominent CeO_2 at higher concentrations, while Mn-doped samples showed YAG with a minor unidentified impurity. FESEM analysis revealed spherical, agglomerated particles. Ce-doped YAG exhibited broad emission between 450&ndash650 nm, whereas Mn-doped YAG showed peaks at 630 nm and 785 nm with maximum intensity at 678 nm. The optimum doping levels were determined to be 5 mol% for Ce and 2 mol% for Mn. Using these optimized powders, lightweight and flexible Ce: YAG&ndashPVDF and Mn: YAG&ndashPVDF composite films were fabricated. XRD confirmed the incorporation of phosphors within the polymer matrix, and FESEM showed a uniform polymer&ndashparticle network. Photoluminescence spectra displayed dual emissions: 350&ndash450 nm (PVDF) with 450&ndash660 nm (Ce: YAG) and 360&ndash418 nm (PVDF) with 418&ndash520 nm (Mn: YAG). The corresponding CIE chromaticity coordinates placed Ce:YAG&ndashPVDF in the bluish-greenish-white region and Mn:YAG&ndashPVDF in the bluish-pink region close to white light. These results highlight the potential of YAG&ndashPVDF composites as flexible luminescent materials.