National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Development of CNT embedded Natural Fiber/Polymer composites and their Environmental durability analysis
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Venue	: Seminar Room (MM Dept.)
Date and Time	: 22 Aug 2025 (11 AM)
Abstract	: Bio-based materials play a crucial role in promoting a sustainable future by mitigating the negative impacts of climate change, which is mostly caused by fossil fuel consumption. Natural fiber composites have seen an uptick in the last two decades because of the demand for environmentally acceptable alternatives that are biodegradable and recyclable. Composites are widely employed in various industries, including automotive, packaging, sports, construction, and consumer products. Hemp fiber is valued for its superior mechanical characteristics, compared to glass fibers. However, there are difficulties for uses with composites since most of the natural fibres and polymer matrix combinations are incompatible with each other. It is notable that NFRP composites frequently have low mechanical strength, heat resistance, water repellence, and antibacterial qualities limits their use in many applications. A possible solution to address these drawbacks is to modify the matrix or apply surface treatments to the fiber. Another strategy involves adding fillers to the polymeric matrix or grafting fillers onto natural fibers, as studied by researchers. The present study focuses on the assessment of hemp fiber/epoxy (HE) composites with NaOH treatment and various levels of multi-walled carbon nanotube (MWCNT) loading, specifically evaluating the effect of 0.1 wt.%, 0.2 wt.%, and 0.3 wt.% MWCNT content on the final composite's properties. Flexural, tensile, and short beam shear testing at room temperature revealed that the addition of 0.2% MWCNT to the hemp fiber/epoxy (HE) composite resulted in the best mechanical performance among all the CNT-modified composite systems. Dynamic mechanical thermal analysis (DMTA) was conducted to evaluate the viscoelastic behaviour of all composites across a temperature range. The chemical restructuring