
Departmental Seminar

Seminar Title	: Enhancing Mechanical and Tribological Performance in Al-based Nanocomposites through Tailored Integration of Equal weight Graphite Nanoplatelet and Hexagonal Boron Nitride Binary Hybrid Nanofillers
Speaker	: Arka Ghosh
Supervisor	: 8208042495
Venue	: M.Tech class room (MM 202E), MM Annex building
Date and Time	: 16 Dec 2024 (11:00 am)
Abstract	: This study investigates the effects of incorporating GnP50hBN50 binary nanofiller, composed of graphene nanoplatelets (GnP) and hexagonal boron nitride (hBN), into an aluminium (Al) matrix. Morphological analysis via SEM, HRTEM, and XRD confirmed the structural integrity of both GnP and hBN after ball milling. Optimal nanofiller dispersion was observed at 1 wt.%, leading to the highest relative density (□93.12%) and hardness (□649.52 MPa). Higher filler concentrations led to agglomeration, reducing both mechanical properties and wear resistance. The Al-1 wt.% GnP50hBN50 nanocomposite exhibited superior wear resistance with a minimum wear track width of □1.30 mm, whereas higher filler content increased agglomeration and porosity. Compression tests showed the highest compressive strength of □569.89 MPa at 1 wt.% filler, while Young's modulus increased at higher filler content. Overall, 1 wt.% GnP50hBN50 binary hybrid nanofillers were found to be the optimal filler concentration for enhancing the mechanical and tribological properties of Al-based nanocomposites. Keywords: Graphite nanoplatelets, hexagonal boron nitride, Wear, Binary hybrid nanofiller, Al-based nanocomposite