National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Perspective of wear and oxidation resistant nanostructured ceramic oxides for structural applications
Speaker	: Prof. Anshuman Patra
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Venue	: M.Tech class room (PG Building)
Date and Time	: 18 Mar 2024 (11:00 AM)
Abstract	: Dispersion of high temperature stable nanostructured Y_2O_3 in superalloys shows encouraging prospects in improving the mechanical, tribological and high temperature oxidation resistance. Various ceramic oxides such as Y_2O_3, 50Y_2O_3-50Al_2O_3, 50Y_2O_3-50TiO_2, 50Y_2O_3-50Cr_2O_3 (in weight%) has been synthesized by mechanical alloying for 20 h in flowing argon atmosphere (flow rate : 100 ml/min). The mechanically alloyed powders are compacted in a uniaxial hydraulic press to fabricate cylindrical pellets. The pellets are consolidated in controlled (Ar/H_2) atmosphere to produce bulk compacts. The inert atmosphere synthesis and consolidation hinder the atmospheric oxygen ingress to improve the particle bonding and mechanical properties. The 20 h mechanically alloyed powders show mostly regular and ultrafine particles (<1 μm). The density of the pellets after compaction of all the oxides systems is in the range between 46-56%. Comparative studies of mechanical, tribological and high temperature oxidation of the oxides have been carried out. The present research will provide a roadmap to design ceramic oxides to achieve sustainable structural applications.