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Departmental Seminar

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Seminar Title : Perspective of wear and oxidation resistant nanostructured ceramic oxides for structural applications  
Speaker : Prof. Anshuman Patra  
Supervisor : 8917483254  
Venue : M.Tech class room (PG Building)  
Date and Time : 18 Mar 2024 (11:00 AM)  
Abstract : Dispersion of high temperature stable nanostructured Y<sub>2</sub>O<sub>3</sub> in superalloys shows encouraging prospects in improving the mechanical, tribological and high temperature oxidation resistance. Various ceramic oxides such as Y<sub>2</sub>O<sub>3</sub>, 50Y<sub>2</sub>O<sub>3</sub>-50Al<sub>2</sub>O<sub>3</sub>, 50Y<sub>2</sub>O<sub>3</sub>-50TiO<sub>2</sub>, 50Y<sub>2</sub>O<sub>3</sub>-50Cr<sub>2</sub>O<sub>3</sub> (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<sub>2</sub>) 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.