


University of Liège

 Faculté des Sciences appliquées
 Aerospace & Mechanical Engineering

Science des Matériaux Métalliques (MMS)




 Microstructure study, phase change, thermophysical properties, thermal treatments, nanoindentation, corrosion, metal foils, metallography, powder metallurgy, thixoforming

Questions ?

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Main study areas and research topics

- Metallic microstructure characterization (including additive manufactured pieces)
- Relationship between microstructure and mechanical properties
- Influence of thermal treatments on phase change
- Measurement of thermophysical properties (thermal conductivity, Cp, alpha, ...)
- Measurement of wear resistance and friction coefficient
- Study and characterization of alloys during fusion
- Developpement of taylored microstructures: powder metallurgy, thixo-steel, vacuum deposition
- Metal matrix composite
- Failure mechanisms in metals
- Image analysis with ImageJ
- Thermodynamic calculation of phase diagram
- Study of thin coatings for foils fabrication
- Thixoforming

Last Research Project

- C-MG composites
- SINUS project (High performance numeric simulation)
- Thixowal (thixoforming of steel)
- EBeamfoil (manufacturing of thin metallic foils)
- TipTopLam (Titanium rapid manufacturing)
- Blisks (development of light rotor components for aircrafts)
- APC (integrate composite materials in aircrafts)
- VIF (Virtual Intelligent Forging)
- RECYLCLAD (manufacturing of bimetallic cylinders by laser cladding)
- IAWATHA (additive manufacturing)
- RONIDJOS (improved structural joint for composites and steel)
- Qualam (Quality in additive manufacturing)
- Moulfrit (fabrication de moules en céramique par méthodes additives)

Extraordinary engineering equipments

Metallography

- Metallographic preparation, chemical and electrochemical etching
- Electrolytical thinning of specimens for TEM
- Optic microscope and stereoscope
- Hardness EMCO devices
- Software thermo-Calc and MTData

Thermophysical measurements and phase transformations

- Diffusivimeter Laser Flash: Netzsch LFA427 (RT-1800 °C)
- DCS: Netzsch DSC 404C (RT-1500 °C) equippd for thermal capacity measurement (Cp)
- ATD and Thermogravimeter
- Dilatometer

Nanoindenter

Tribometer

- Hot wear: Tribometer pin on disk CSM (RT-1000 °C)

Thixoforming device (APT 500T)

Services proposal

- Identification of rupture causes in metals (corrosion, microstructure, thermal treatments, shock, fatigue, creep...)
- Determination of thermophysical properties, in the 20-1600 °C range (metals, alloys, coatings, powders) : dilatation, specific heat, thermal conductivity, thermal diffusivity, young modulus at temperature
- Thermal treatments in vacuum or controlled atmosphere (H2...)
- Support to the development of powder metallurgy products
- Manufacturing of steel and aluminium parts by thixoforming : (prototypes and small series)
- TEM –SEM microscopy
- Determination of wear and friction coefficient
- Thermodynamical calculation of phase diagram

Training proposal

- Non-destructive analysis : from conventional methods to IR tomography

Related Lab'Insight Event

Innovative and Sustainable Coatings

Organisé le jeudi 12 mai 2016 à l'UMONS