

The purpose of the Young Scientist Meeting Program is to show CENIM research activities from the perspective and the work of our young researchers. In this edition, we have the participation of an invited speaker from the University of Mondragón, and two young researchers that have enrolled CENIM to carry out their Thesis' investigations after their Master Degree. They will show their ongoing work on metallic alloys, from the design, production and transformation to the analysis of their final use in different industrial sectors.

**09.30h : 10.00h**

**On the relationship of microstructure and in-use properties of nanostructured bainitic steels**

**R. Rementeria**

*CENIM (CSIC), MATERALIA Research Group, Madrid*

A new generation of steels has been designed for the transformation to occur at low temperature in high-carbon silicon-rich steels, leading to a nanoscale microstructure consisting of extremely fine plates of ferrite with thickness of 20–40 nm and retained austenite. Their potential for industrial application is large because the alloys are routinely manufactured and present the highest strength/toughness combinations ever recorded in bainitic steels. However, there remain many parameters that still have to be characterised, such as fatigue and wear resistance properties.

**10:00h : 10.30h**

**Dehydration of Gypsum Rock by Solar Energy: Preliminary Study**

**Marta Álvarez Leal**

*CENIM (CSIC), W4M Research Group\*, Madrid*

*The Complutense University of Madrid-Faculty of Geological Science, Madrid*

The dehydration process of gypsum rock was studied under concentrated solar energy by using a Fresnel lens with power density of  $260\text{Wcm}^{-2}$ . Temperatures higher than  $700^\circ\text{C}$  were attained for 1min of solar exposure. The effect of grain size of sample and radiation exposure time on the formation of bassanite and anhydrite was studied by XRD. The complete transformation of dehydrate into hemihydrate and/or anhydrite phases is complete for the finer size sample. Plaster composed of 92.7% of anhydrite and 7.3% of bassanite was obtained for 5min of solar exposure. Morphological and textural modifications were followed by SEM and interferometric/confocal profilometer.

(\*). Now at CENIM (CSIC), PROMECO Research Group, Madrid

**10.30h : 10.00h**

**Influence of fluoride concentration and pH on corrosion behaviour and tribocorrosion mechanisms of Ti<sub>13</sub>Nb<sub>13</sub>Zr alloy in oral environment**

**Ione Golvano**

*Associated Unit of CENIM-CSIC and University of Mondragón, Gipuzkoa*

The recent development of reduced modulus near-beta titanium alloys for implant application, such as Ti<sub>13</sub>Nb<sub>13</sub>Zr, provides a composition with even more biocompatible alloying elements compared to the widely used titanium alloys and also a notable reduction of the stress shielding effect by means of closely match the elastic modulus of the implant to that of the bone. In addition, a dental implant also have to deal with tribocorrosion events when it is inserted in the mouth, since there is a combination of mastication forces in a changing corrosive environment, such as saliva. This leads to the destruction of the passive oxide layer of the titanium alloy, which remains exposed to the corrosive medium. With this regard, some light is still needed on understanding the tribocorrosion behaviour and mechanisms of this new generation of near beta titanium alloys for dental implant application in a changing oral environment.