Department of Mechanical Engineering
機械工程學系

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Seminar

Date: 29 October 2009 (Thursday)
Time: 4:00 pm - 5:00 pm
Venue: **FJ 303**, The Hong Kong Polytechnic University

Mechanical behavior of bulk metallic glasses - Impact of the partial crystallization

Dr. Sebastien Gravier

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Abstract:

Bulk Metallic Glasses (BMG) are quite particular materials having properties between metals and glasses, being at the same time brittle and tough. After a brief description of the SIMaP laboratory, this talk will focus on the mechanical properties of BMG and partially crystallized BMGs.
Due to their lack of atomic long range order, bulk metallic glasses exhibit both spectacular mechanical properties at room temperature (high strength, large elastic domain, hardness...) and a high forming ability at temperatures higher than their glass transition temperature. Moreover, metallic glasses being “out of equilibrium” materials, glass / crystal nanocomposites can be produced by heat treatments and their mechanical properties appear attractive. This talks deals with the very strong effect of such a nano-crystallization (with a particular attention given to the estimation of the crystal volume fraction in the composite) on both the mechanical properties at room temperature and the forming ability at high temperature in the case of zirconium based metallic glass. In this framework, various techniques of mechanical (compression, nanoindentation, dynamic mechanical analysis) and structural (DSC, XRD, TEM...) characterisations have been carried out. Those various analyses allow concluding that, despite the strong modifications of the mechanical results with nano-crystallization, the basic deformation mechanisms do not seem to be strongly affected.

Biosketch:

Dr. Sebastien Gravier is an assistant professor in the GPM2 group of the SIMAP laboratory (Science et Ingéniérie des MAtériaux et des Procédés) at Université Joseph Fourier (UJF), France. He did his undergraduate and graduate work at Grenoble INP (France) and was a postdoctoral Researcher at The Université catholique de Louvain (Belgium) before becoming a Faculty member at UJF in 2007.
His research interests span the area of micro- and macro- mechanics of materials, with an emphasis on Metallic Glasses deformation investigation. His main research fields concern Bulk Metallic Glasses, thin films of both amorphous and crystalline materials, high temperature deformation and forming.

* Refreshment will be served after the seminar.