



MONASH University

DEPARTMENT OF MATERIALS
ENGINEERING



ARC Centre of Excellence
Design in Light Metals

Joint Seminar

PROBING THE EARLY STAGES OF ELEMENTAL PARTITIONING DURING THE NUCLEATION AND GROWTH OF INTRA-GRANULAR ALPHA IN BETA MATRIX OF TITANIUM ALLOYS

Dr. Raj Banerjee
Department of Materials Science and Engineering
University of North Texas
USA

Wednesday 25th June 2008, 3:00 p.m. – 4:00 p.m.
Engineering Lecture Theatre E7

The solid-state precipitation of alpha within the beta matrix of titanium alloys is a rather complex phenomenon involving both a structural bcc to hcp transformation as well as the appropriate diffusional partitioning of the alloying elements. Developments in advanced characterization techniques such as high-resolution scanning transmission electron microscopy and 3D atom probe (3DAP) tomography allow for unprecedented insights into the true atomic scale structure and chemistry changes associated with the precipitation of alpha. Such a coupling of 3DAP and TEM observations, on complex beta titanium alloys, indicate that when these alloys are solutionized in the single beta phase, quenched to room temperature, and subsequently aged at lower temperatures, the metastable omega phase can assist in the nucleation of the stable alpha phase. Furthermore, the 3DAP results clearly indicated that the structural component of this beta to alpha transformation precedes the diffusional partitioning of the alloying elements. These results suggest that this is a mixed mode (displacive + diffusive) transformation, similar to the bainite transformation in steels, and will be discussed in this presentation.

Visitors are most welcome: Please note the parking arrangements. There is a designated Visitors Car Park (N1) clearly ground-marked by white paint and tickets, at a cost of \$3/day, are available from a dispensing machine. ('Blue' permit designated areas are for Monash members only.). It is also possible to park at other designated Visitors Car Parks (E1, S1 and S2) on the Clayton Campus, but tickets are \$1.4/hour.

Convenor: Dr. Jian-Feng Nie
Tel: 9905 9605
Email: nie@eng.monash.edu.au