



THE INSTITUTE OF MATERIALS (East Asia)

TECHNICAL TALK

- Topic : **Nano-Structured Coatings and TiAl Based Composites**
- Speaker : Wei Gao
School of Engineering
University of Auckland
New Zealand
- Date/Time : **Thursday, 20th April 2006, 5 pm.**
(Refreshments will be served at 4:45 pm).
- Venue : LT 9, NTU (Level 4, North Spine, near SCE)

Abstract:

Nano-structured materials and coatings are a research focus at UoA. This seminar will have two parts. The first part reports our work on the surface nano-crystallisation, nano-structured alloy and composite coatings, and oxide thin films. Magnetron sputtering, thermal spray, electro-chemical deposition, mechanical-thermochemical processes and electro-spark deposition have been used to produce surface nano-crystalline structure. The composition and microstructure can be controlled by using different targets or processing parameters. Nano-structured films provide special chemical, mechanical and optoelectronic properties. High temperature properties are used as an example; physical and mathematical models are established to describe the effects of nanostructure on the properties.

The second part of the talk is on TiAl-Al₂O₃ based powder and composites, which have been produced by an innovative technique. Thermal spraying was used to coat these powders onto Ti alloys. The high temperature oxidation and hot corrosion resistance have been significantly improved. This technique can provide a new generation of coatings to the Ti based alloys, which raises the application temperature from 650°C to 800-900°C. Consolidation of the ultra-fine structured TiAl-Al₂O₃ powder can also provide high performance/cost-effective TiAl based composites for applications in automobile, computer and electronic device industries.

About the Speaker

Wei Gao, Fellow of the Royal Society NZ, is a Professor of Materials Science and Engineering, and the Director of Advanced Materials and Nanotechnology Research Centre at the University of Auckland. He received his D.Phil. from Oxford University UK, spent 5 years as a Principal Investigator and Director of Rapid Solidification Lab at MIT USA. His active research includes *Nano-Materials and Coatings, Electronic Materials and Thin Films, High Temperature Oxidation and Corrosion, Superconductors, Intermetallics, Rapid Solidification and Amorphous Alloys*. He has published more than 400 refereed research papers, holds 9 patents, and received a number of awards by the New Zealand Government and professional societies for “outstanding contributions to science and engineering”.

Admission is free and all are welcome. For enquiries, please contact A/Prof R.V. Ramanujan, School of Materials Science and Engineering, Tel: 6790 4342