ADVANCED CHARACTERISATION TECHNIQUES FOR MATERIAL DEVELOPMENT

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Abstract

This presentation provides an overview of how advanced characterisation approaches, such as Synchrotron X-ray radiation facilities and high voltage transmission electron microscopies, can be used in the development of materials for energy storage and electronic applications. The following three practical/experimental advanced approaches will be discussed along with their use in international collaborative projects, (1) Synchrotron X-ray diffraction (In-situ powder diffraction and In-situ plate diffraction for solder joint intermetalics, phase stability and thermal expansion characterisation) at the Australian Synchrotron, (2) Synchrotron X-ray imaging (Micro-XRF mapping and in-situ soldering for the formation and trace element distributions in the solder joint intermetalics) at SPring-8 synchrotron, and (3) Ultra-high voltage transmission electron microscopy (In-situ heating observation for hydrogen release behavior from bulk grains) at Kyushu University.

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Biography

Dr Nogita graduated as an Engineer in Japan in 1990 and worked in the nuclear power industry with Hitachi Ltd. He was awarded a PhD from Kyushu University in 1997 and has subsequently worked on a variety of research projects, including the development of materials for alternative power industries and environmentally friendly applications. He migrated to Australia in 1999 after accepting a position at the University of Queensland, where he became the founding director of the Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM) within the School of Mechanical & Mining Engineering in July 2012. He is also an invited Professor at Kyushu University and a research advisor at the University of Malaysia Perlis. His research is in three major areas, namely lead-free solders, hydrogen-storage alloys and light metals. He holds 10 international patents and has authored over 130 refereed scientific papers and has a current ‘h-index’ of 28. He has been instrumental in the establishment of a hydrogen storage spin-off company, Hydrexia Pty. Ltd., and participated in the World Solar Challenge, one of the largest solar car racing event between Darwin to Adelaide in Australia, as a member of TeamArrow.