

Energy Materials 2012 – High Temperature Materials Conference

18-19<sup>th</sup> October 2012

Sir Denis Rooke Building, Holywell Park, Loughborough University

Names of Invited Speakers:

Dr Fujio Abe, NIMS, Japan  
Prof Kouichi Maruyama, Tohoku University, Japan  
Prof Masakazu Okazaki, Nagaoka University, Japan  
Dr Hideyuki Murakami, NIMS, Japan  
Prof Chikashi Nishimura, NIMS, Japan\*

Dr Ian Watson, E.On New Build and Technology, UK  
Dr David Allen, E.On New Build and Technology, UK  
Dr David Rickerby, Rolls-Royce plc  
Dr Cathie Rae, Cambridge University, UK  
Prof Rachel Thomson, Loughborough University, UK

Other speakers from the UK included researchers from Special Metals, Rolls-Royce plc, Cambridge University, Loughborough University, Goodwin Steels Castings, University of Nottingham, University of Oxford, Doosan Power Systems, RWE npower and Imperial College London.

Other speakers from abroad included a number of Japanese researchers from the National Institute for Materials Sciences, Tsukuba, IHI, Shibaura Institute of Technology, Japan, and the Institute of Welding in Gliwice, Poland.

Number of participants: 60

The symposium attracted international experts in both the development of, and life time prediction for, materials for use at high temperatures in conventional power plant. This included both high temperature steels for use in efficient steam plant, and coated nickel based superalloys used in industrial gas turbines. The event brought together researchers in the UK and Japan to share research areas, network, and explore prospects for deeper exchange and collaboration.

The conference appears to have gone very well and was well-received by all participants. We have had several positive feedback comments since the conclusion of the symposium.

The technical sessions were excellent, with plenty of interaction and discussion – presentations covered four main topic areas. In the area of high temperature steels, we heard that new challenges continue to come up in the case of materials which have been in service for many, many years. We also had elegant overviews of the influence of the presence of different elements on the microstructure and mechanical properties of novel steels for power generation from both UK and Japanese researchers, together with new ways of analysing creep behaviour. There were also some excellent presentations showcasing the latest developments in advanced characterization techniques for high temperature materials. In the case of protective coatings for high temperature service, it was highlighted that they needed to be an integrated part of the original design solution rather than reactive design at a later date. Recent developments in modelling coating system behavior were also presented, together with the need for complex tests to be designed which replicate service performance accurately. We also heard about some of the challenges involved in implementing new nickel based materials for the latest generation of high temperature power plant.

It was particularly pleasing that we had some excellent presentations from younger researchers, both in the dedicated Early Career Researcher session, and in the poster session and indeed elsewhere in the conference. In fact, one of the senior Japanese Professors at the conference commented to me that seeing the enthusiasm of the young people had energised him and filled him with renewed enthusiasm for his research!

On the social interaction side, a visit was enjoyed to the local National Trust property, Kedleston Hall, by some of the overseas visitors the day before the conference, followed by dinner in a traditional English country pub, hosted by myself. Many people also took advantage of the post conference tour of the Loughborough Materials Characterisation Centre facilities. The poster session was interactive between all participants, and even included the opportunity for people to have their photograph taken with the Olympic Torch!

As an immediate follow-up, one researcher from NIMS, Japan, is currently in Loughborough undertaking a 3 month placement to perform specialist materials characterization. We also had extensive discussions after the meeting with a second researcher about a visit they are planning to undertake in the New Year to carry out a series of specialist experiments. I have also been invited to visit Japan to speak at a forthcoming conference.

It seems probable that there will be other UK-Japan collaborations between some of the attendees at the conference, including those from industry, in particular in the area of high temperature steels. We anticipate significant further impacts into the future, and intend to develop research collaborations under the auspices of the Comprehensive Collaborative

Agreement which has now been signed between Loughborough University and the National Institute for Materials Science in Tsukuba. I believe some of the conference attendees were also interested in the various opportunities presented by the JSPS at the conference, and am sure that they will be following those up separately.

I would finally like to take this opportunity to thank the JSPS for their support of the conference, which was much appreciated.

Prof RC Thomson  
November 2012



Symposium Participants