

PhD Studentship

Microstructure evolution during forging Nickel-base superalloys

An opportunity has arisen for exceptional graduates interested in doing a PhD in advanced metallurgy. The PhD project aims to characterise and study the microstructural development during forging of nickel base superalloys used by the aerospace industry. The project will make extensive use of the University's suite of state of the art characterisation equipment and advanced testing facilities to simulate the forging of these materials and help develop models of microstructure evolution.

Nickel-base superalloys are the most important class of high temperature structural materials and are widely used in land-based gas turbines and aeroengines. Their mechanical properties are strongly affected by the microstructure. Thermomechanical processes such as forging and heat treatment have a very significant effect on the microstructure and hence the mechanical performance of high performance metallic materials. In order to further develop process simulation tools, that will help to shorten development times for new parts and will lead to more efficient use of material, we require a more mechanistic understanding of how forging parameters affect microstructure evolution.

This research project is a collaboration between the School of Materials at the University of Manchester, UK (<http://www.materials.manchester.ac.uk/>) and Otto Fuchs, Germany (<http://www.otto-fuchs.com/index.php?id=1&L=1>). The School of Materials was assessed in 2008 as having the highest level of research power (quality multiplied by volume) of any university materials activity in the UK. It has a particularly thriving research activity in advanced metallurgy, with significant activities in high temperature alloys, metals for power generation and light alloy research, much of it done in direct collaboration with industry. OTTO FUCHS KG is a privately owned German company producing forgings and extrusions for the aerospace, automotive and engineering market. OTTO FUCHS KG is one of the major suppliers for aeroengine forgings worldwide.

This studentship **is fully funded** for students who are EU citizens or have been working in the UK for at least 3 years. The project duration is 3 years with a stipend of ~£15.5k per year (tax free). A prerequisite is that the successful applicant will have graduated with a first class or upper second class undergraduate masters degree (or equivalent) in Materials Science, Physics, Engineering or a related discipline.

Any enquiries in the first instance to Dr Joao Quinta da Fonseca or Professor Michael Preuss at the following addresses:

joao.fonseca@manchester.ac.uk or michael.preuss@manchester.ac.uk