Reaction mechanisms of natural gas in a novel low carbon, low energy alternative iron making process

PhD

Funding: 3.5 years. This position is open to UK, EU and international students

Supervisors: Dr Zushu Li (WMG), Professor Sridhar Seetharaman (WMG), Koen Meijer (Tata Steel Europe)

Supporting company: Tata Steel Europe

Start Date: As soon as possible

Project overview

An exciting opportunity to work as part of our Advanced Steel Research Centre at WMG, University of Warwick, an internationally leading centre for steel research. The ASRC is located in the new Advanced Manufacturing and Materials building and has benefited from a multi-million pound investment in new equipment.

The steels processing group consists of five academic staff, over ten research fellows, and more than twenty PhD students working in steel processing, characterisation and applications. You will join a rapidly expanding group with opportunities for collaborative as well as individual research, and benefit from new facilities and a supportive environment. The ASRC has strong links with industry, with many projects being sponsored and opportunities exit for placements within industry.

The steel industry is facing significant challenges in achieving and sustaining competitiveness, such as strict environment regulations, new energy sources, global overcapacity, and competition from other materials. In particular, for the European steel industry, the EU target of the 80-95% reduction in CO2 emissions by 2050 compared to 1990 for European industry is far beyond the reach of the steel sector. To create an industry that will be sustainable for the future, extraction of metals needs to be lean in energy, low in C footprint and flexible with regard to raw material/energy sources. The use of low-cost & low carbon intensity natural gas can potentially reduce further the consumption of fossil fuel and the carbon footprint of the promising low carbon, low energy alternative iron making process under active development.

This project aims to generate fundamental knowledge on the use of natural gas in a novel low energy, low carbon alternative iron making process. More specifically, it intends to advance the reaction mechanisms of natural gas with slag and metal in the alternative iron making process, and reveal the possibility of using natural gas in the process. This will be achieved by using specifically designed modern experimental techniques to study the reactions in the gas-slag-metal systems at high temperatures, carrying out thermodynamic and kinetic simulations for the systems studied, and characterising the samples and product gases generated with the aid of advanced characterisation facilities in the ASRC.

The project provides an outstanding opportunity to be involved in cutting-edge research of the next generation sustainable steel manufacturing, and gives valuable exposure to a major player of the industry - Tata Steel Europe by working closely with industrial sponsor. This project is fully sponsored by Tata Steel Europe.

Entry requirements

Candidates should have a minimum of an upper second (2.1) honours degree in Materials Sciences (including Metallurgy, Ceramics), Chemical Engineering, Chemistry, Geology or related disciplines. International applicants must meet the English language requirements.
**Funding**
This position is open to UK, EU and international students. A stipend of £14,296 will be paid per annum for 3.5 years. An industrial top up of £3,000 per annum will also be provided.

**To apply**
To apply please complete our [online enquiry form](#) and upload your CV.