THE UNIVERSITY OF MANCHESTER

PARTICULARS OF APPOINTMENT

FACULTY OF SCIENCE & ENGINEERING

SCHOOL OF CHEMICAL ENGINEERING & ANALYTICAL SCIENCE

RESEARCH ASSOCIATE IN GAS-SOLID REACTORS APPLIED TO STEEL INDUSTRY

VACANCY REF: S&E-14056

Salary:	£32,236 to £39,609 per annum, depending on relevant experience
Hours:	Full Time
Duration:	Fixed Term from 1 September 2019 until 28 February 2023
Location:	Sackville Street, Manchester

Enquiries about the vacancy, shortlisting and interviews:
Contact: Dr Vincenzo Spallina
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Tel: 0161 306 9339

BACKGROUND

Advanced energy and chemical plants require new reactors and processes designed to combine high efficiency, attractive economics and reduced pollutant emissions. A possible solution to intensify the process is the combination of reaction and separation in a single unit operation. A gas-solid reactor consists of a bed filled with particles which react if exposed in a certain environment and afterward they are regenerated. Several very promising processes proposed for near-zero emission from industry such as chemical looping and calcium looping technologies are based on gas solid reactions. Most of these processes occur at high temperature and pressure, and often combine exothermic and endothermic reactions so that the proper integration will become essential to achieve high efficiency with near-zero emissions.

The key objective of BREIN-STORM project (Boosting Reduction of Energy Intensity in cleaN STeelworks platfORM) is the development of a new process integrating calcium looping (CaL) and chemical looping combustion (CLC) with the aim of reducing the energy demand, carbon footprint and other life cycle environmental impacts as well as costs in the steel sector. This recent EPSRC project includes the University of Cambridge, University of Leeds and it is made in partnership with British Steel, Tata Steel and the Instituto National del Carbon (CSIC, Spanish Research Council).

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Overall Purpose of the Job

We are seeking to recruit a Research Associate to work under the supervision of Dr. Vincenzo Spallina in the School of Chemical Engineering and Analytical Science of the University of Manchester. The aim of this project is to demonstrate the feasibility of the gas-solid process using different reactor type to produce H_2 and separate pure CO_2. The project combines numerical modelling and experimental proof-of-concept of the technology and the subsequent technology scale-up.

You should already hold or be nearing completion of a PhD/DPhil in chemical engineering, energy engineering, focused on reactor design and process development with proven experience in advanced reactor modelling, knowledge on gas-solid reactions and catalysis. Previous experience on chemical and calcium looping technology are desirable and particularly welcome.

The School of Chemical Engineering and Analytical Science (CEAS) at the University of Manchester is a world leading school playing a key role in the UK catalysis and process integration landscape. The School is committed to Athena SWAN principles to promote women in science and engineering. The University of Manchester values a diverse workforce and welcomes applications from all sections of the community.

Key Responsibilities, Accountabilities or Duties

- Be involved in the assessment of student knowledge and supervision of projects.
- Develop research objectives and proposals for own or joint research, with the assistance of a mentor if required.
- Conduct individual and collaborative research projects.
- Write up research work for publication.
- Continually update knowledge and understanding in field or specialism.
- Translate knowledge of advances in the subject area into research activity.
- Communicate complex information, orally, in writing and electronically.
- Communicate material of a specialist or highly technical nature.
- Liaise with colleagues and students.
- Build internal contacts and participate in internal networks for the exchange of information and to form relationships for future collaboration.
- Join external networks to share information and identify potential sources of funds.
- Manage own research and administrative activities, with guidance if required.

- Work with colleagues on joint projects, as required.
- Collaborate with academic colleagues on areas of shared research interest.
- Attend and contribute to relevant meetings.
- Use new research techniques and methods.
- Use creativity to analyse and interpret research data and draw conclusions on the outcomes.
- Contribute to collaborative decision making with colleagues in areas of research.
- Use research resources, laboratories and workshops as appropriate.
- Plan and manage own research activity in collaboration with others.
- Be aware of the risks in the work environment and their potential impact on their own work and that of others.

PERSON SPECIFICATION

Essential Knowledge, Skills and Experience

- Have, or be about to obtain, a relevant PhD (or equivalent).
- Specialist knowledge in the discipline of chemical engineering, process integration, reactor engineering and catalysis.
- Experience in reactor modelling for catalytic and gas-solid reactors.
- Excellent communication and interpersonal skills.
- Excellent time management and organisational skills.
- Ability to work independently and as part of a team.
- Ability to present in both written and oral publications.
- Ability to liaise confidently and effectively with a range of individuals.
- Flexible approach to dealing with research problems as they arise.
- Willingness to learn and develop.
- Ability to meet deadlines.
- Strong journal publication record.
- The ability to evaluate complex data.

- Ability to contribute to broader management and administrative processes.
- Ability to assess and organise resources.
- Understand equal opportunity issues as they may impact on areas of research content.