Project Title: Development of electrocatalyst materials for highly efficient electrochemical water splitting (based at University of New South Wales)

Project background and description:

Significance:

1) Efficient high purity hydrogen production as a clean energy carriers and fuels with a central figure in a wide range of energy applications, from production, conversion to storage and utilization
2) In-depth understanding of structural analysis, electrocatalysis, and materials fabrication methods for advanced electrocatalyst development
3) Plausible high efficiency in electrocatalysis and hydrogen production via detailed performance descriptors to narrow down the gap between lab-scale measurements and industrial-scale applications

Knowledge gap:

1) In-depth understanding of surface and interface chemistry for electrocatalytic reactions
2) Vast heterogeneous electrocatalyst screening and evaluation for electrochemical water splitting reactions to reach the state-of-the-art performance
3) Unravelling the less-understood activity- and stability- enhancement factors in electrolytic media to reach benchmark intrinsic electrocatalytic activity

Aim/objectives:

1) Identification of the most active and efficient heterogeneous catalyst materials based on noble metal-free transition metals at different structural categories for oxygen evolution reaction (OER) and hydrogen evolution reaction (HER)
2) Delivering state-of-the-art electrocatalytic performances for OER and HER processes with various multi-metallic structures
3) Conducting detailed structural and electronic analyses to study the reaction mechanism, structure-activity relationships and factors controlling dynamic stability of electrocatalysts

Environment

The GlobHE Training Centre is offering 12 Higher Degree by Research (HDR) Scholarships (PhD) that will provide a unique training opportunity through:

- World-class and state-of-the-art facilities and experts across the participating universities, research institutions, industry partners and other organisations
- An integrated Training Centre research agenda with inter-disciplinary projects across 5 themes area
- Opportunity to work or placement with partner organisations and industry partners
- Research skills, career development workshops and relevant industrial training

- Competitive support for national and international conference travel and networking opportunity
- Generous project support and excellent mentorship
- Delivering the next generation of highly skilled workforce to give Australia the ability to build home-grown hydrogen solutions and economic models.

Eligibility

PhD applicants must be acceptable as candidates for a PhD degree at the University of New South Wales, University of Queensland, University of Sydney, University of Newcastle, Curtin University and Monash University.

The minimum requirement for admission to a PhD programme is:

- an appropriate Bachelor degree with upper second class Honours from one of the above universities; or
- a completed Masters by Research from one of the above universities with a substantial research component and demonstrated capacity for timely completion of a high quality research thesis; or
- an equivalent qualification from a tertiary institution as determined by the Faculty Higher Degree Committee (HDC)

The minimum requirement for Scholarship with admission to a PhD is:

- a four-year Bachelor's degree with Honours Class I from an Australian institution or equivalent research qualification experience. This qualification must be in a field relevant to the proposed area of research.

Please note that ALL applicants, whether domestic or international must provide evidence that their language ability meets the **minimum English language*** requirements. The following table provides guidelines on common English language test acceptable for meeting English requirement:

IELTS (Academic)	TOEFL (Internet based test)	Pearson Test (Academic)
Overall: 6.5 (min 6.0 in each subset)	Overall: 90 (min 23 in writing, 22 in reading, listening and speaking)	Overall 64 (min. 54 in each subset)

*please check individual institutions' requirement for English language. For UNSW, check out: https://www.international.unsw.edu.au/english-language-requirements?field_english_language_tid=4018

Selection Criteria

- Bachelor (honours) or Masters degree from relevant disciplines include chemical engineering, mechanical, electrical engineering, computer science and social policy; at 1st class or upper second class level, or equivalent
- Proficiency in computer programming/modelling is required for some of the projects.
- In assessing applications, preference will be given to applicants who can demonstrate an ability to work across disciplines, have excellent interpersonal, communication and management skills
- When applying for a particular project, please state briefly and clearly the relevance of your degree and/or your experience to the project description

PhD Stipend

PhD scholarships will be available for a period of three and a half (3.5) years. The PhD stipend rate is $33,413 per annum tax-free. International applicants are encouraged to apply and maybe eligible for Tuition Fee Scholarship. See International Research Scholarship (for UNSW applicants).

Application Process

Interested applicant must email the following to be considered for Scholarship:

- CV
- Academic transcripts for all completed/pending completion degree
- Testamurs of previous study
- Statement addressing interest relevant to selection criteria
- Name of referees (can be academic or former employer)

For UNSW application, applicants are encouraged to use the HDR Self-assessment Tool: https://selfassessment.research.unsw.edu.au/ to give indication of eligibility and competitiveness for a scholarship (please also send the outcome of this self assessment).

Closing date:

Scholarship application outcomes are released progressively from the 'Offers Released' date. To find out more on 'Offers Released' date for your application round, visit Key Dates for specific Universities. Please note that there are different deadlines for Domestic and International applicants.

For those wanting to start studies in 2021/2022 – UNSW scholarship application:

- Domestic applicants closed on 9th July 2021 (T3 2021 start)
- International applicants closed on 27 August 2021 (T1/T2 2022 start)

Enquiries

For general enquiries regarding the Training Centre, please contact Professor Rose Amal: r.amal@unsw.edu.au, Professor Francois Aguey Zinsou Kondo: f.aguey@unsw.edu.au

For enquiries on PhD project, please contact Prof Chuan Zhao via chuan.zhao@unsw.edu.au