PhD studentship in water corrosion of fine-grained ceramics

Department/Faculty: Department of Materials, Faculty of Engineering
Duration: 36 months

Supervisors: Dr Katharina Marquardt
Start Date: 1st October 2019

“Ceramic property variation as a function of water corrosion at interfaces”
Understanding of the impact of interfaces is critical to enhance their properties for the development of future industrial materials. Such materials find application in for example biomedical devices or corrosion resistant surface treatment of cooling systems.
Here we will focus on the investigations of ceramics that are exposed to high-temperature or supercritical water. Understanding the reaction mechanism at interfaces and the character variations of interfaces as a function of exposure to $\text{H}_2\text{O}$ is at the heart of these studies. The results are also applicable to reactions at conditions of the lower crustal zone and thus of interest to Earth sciences.

The student’s role will be to synthesise, react and characterize the material using mechanical testing, novel scanning electron microscopy techniques as developed for electron backscatter diffraction (EBSD) and transmission Kikuchi diffraction (TKD). Additionally, transmission electron microscopy and infrared spectroscopy will be employed to study the interfacial structure and composition of the ceramics at the nm-scale.

The candidate will learn during her/his stay ceramic processing, sol-gel sintering techniques, as well as structural and mechanical characterization techniques. He/she will develop strong skills in the scientific approach, problem solving, and the communication of scientific results.

We are seeking applications from excellent, motivated and curious UK (or EU with UK residency proof) candidates with a minimum 2:1 (or equivalent) first degree in Materials Science, Physical Chemistry, Mineral Physics or Applied Geosciences for a three-year PhD studentship. The project will be based in the Centre for Advanced Structural Ceramics (http://www3.imperial.ac.uk/structuralceramics) and the Department of Materials at Imperial College London. This three-year studentship will provide full ‘home rate’ fees plus the standard maintenance stipend to UK and EU students who meet the residency criteria (currently a stipend of £16,553).

Applications will be processed as received. For questions or further details regarding the project, please contact Dr Katharina Marquardt, k.marquardt@imperial.ac.uk.

Closing Date: 22 April 2019

For questions regarding the admissions process, please contact Materials student office (materialsstudentoffice@imperial.ac.uk). Formal applications can be completed online but only after informal enquiries: http://www3.imperial.ac.uk/materials/research/phdopportunities while information about the Department can be found at http://www3.imperial.ac.uk/materials.