

LERU STudent REseArch Mobility Programme (STREAM) Project proposal



Host University: Leiden University

Main Research Field (drop-down list): 13.3 Chemistry



Specified field, subject:

Materials Science, Chemistry, Physics

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Research project title:

Operando research in heterogeneous catalysis

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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Possible duration in months:

Minimum: 3 months

Maximum: 2 semesters



Suitable for students in: Bachelor level Master level



Prerequisites:

- Minimum GPA 3.2 out of 4
- Sophomore level chemistry or physics or materials science with strong interest in physical chemistry and/or heterogeneous catalysis.



Description:

The nanoscale structure of a catalyst under reaction conditions determines its activity, selectivity, and stability. For the production of sustainable energy and materials, new catalysts are needed. By understanding the structure-activity relationships of catalysts under reaction conditions, insight in the development of these new catalysts can be obtained. Using in situ imaging techniques under industrial conditions, we are currently studying Fischer-Tropsch synthesis, NO reduction and oxidation, hydrodesulfurization, CO oxidation, and chlorine production. The student will be involved in ongoing research investigating the relationship between the structure of the active phase of a catalyst and its activity under industrially relevant conditions. These studies will be performed using scanning tunneling microscopy in high-pressure, high-temperature



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conditions. The student will learn the following experimental techniques: scanning tunneling microscopy, X-ray photoelectron spectroscopy, low-energy electron diffraction, and mass spectrometry. Catalyst preparation consists of physical vapor deposition of nanoparticles onto oxide films on single crystals.

Faculty: Science

Faculty Department: [Leiden Institute of Chemistry \(LIC\)](#)

Deadline for nomination to reach host university:

1 April or else 1 October.

Notification of admission given by the end of:

Approximately 6 weeks after receipt of the application.

Additional information:

- Number of places available per Spring 2017 semester: 1.
- Duration for at least 6 months, but preferably longer.

Contact person:

Ms. Usha Mohunlol - Student and Educational Affairs - Coordinator LERU
STREAM

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