



### **Catalysis...**

Catalysis contributes 20-30% of the gross domestic products of industrialized countries. Catalysts play a vital role in the production of transportation fuels, bulk and fine chemicals in a sustainable way. Many more improvements are expected for the next years.

### **... a fascinating discipline**

NIOK, the Dutch school of research in catalysis, with some 200 PhD students involved in research, offers the opportunity to gain a deeper insight into various aspects of this fascinating discipline: fundamental, theoretical, homogeneous, heterogeneous, industrial catalysis and biocatalysis. The main theme of this course is the molecular approach of catalysis in view of its applications, from catalyst preparation and characterization to reactor engineering.

### **Target audience**

The course is designed for graduates and polytechnic (HBO) levels, either as a first introduction or as a refresher course. Especially graduates preparing a doctoral dissertation related to catalysis are potential attendants, but also those who are already working in industry and feel the need to deepen their insights into catalytic processes.

### **Subjects to be treated**

#### Introductory part

- history of catalysis: homogeneous, heterogeneous and biocatalysis
- chemical and technological aspects of a number of important industrial processes  
These processes will also form the framework for the subjects to be treated in the fundamental and applied parts of the course.
- chemical kinetics of catalyzed reactions

#### Fundamental catalysis

- chemical bonding to surfaces, in metal complexes and in enzymes
- elementary reaction steps in catalysis
- kinetic and mechanistic processes of catalysis

### **Course teachers**

Heterogeneous Catalysis:  
Homogeneous Catalysis:  
Reaction Engineering & Kinetics:  
Biocatalysis:  
Materials & Catalyst Preparation  
Characterization/Spectroscopy  
Case Study/ Biomass (Evening Program)  
Industrial Catalysis

#### Applied catalysis

- catalytic reaction engineering
- preparation of catalyst supports including zeolites
- preparation of supported catalysts

#### Catalyst characterization

- rapid screening techniques and backgrounds
- spectroscopic techniques
- temperature programmed techniques
- adsorption methods

#### Modern developments seen from two angles:

- from the process technology side: more efficient and cleaner processes
- from the theoretical side: development of fundamental catalysis towards an independent science within chemistry and physics.

# Catalysis: An Integrated Approach *A molecular approach to all aspects of catalysis*

19 – 24 November, 2017  
Schiermonnikoog, NL

Annual course organized by NIOK,  
Netherlands Institute for Catalysis Research

Prof. dr. ir. L. Lefferts, University of Twente  
Prof. dr. E. Bouwman, Leiden University  
Prof. dr. Freek Kapteijn, Delft University of Technology  
Prof. dr. U. Hanefeld, Delft University of Technology  
Prof. dr. P. E. de Jongh, Utrecht University  
Dr. M. Tromp, University of Amsterdam  
Prof. dr. J. H. Bitter, Wageningen University  
Dr. M. Ruitenbeek (DOW)

### Place and time

The course is held on the island Schiermonnikoog. The lectures take place in "Het Dorpshuis", Torenstreek 18a. Lodging is in Hotel Van der Werff, Reeweg 2, Schiermonnikoog.

The course starts Sunday 19 November (afternoon arrival) and ends Friday 24 November after lunch.

### Textbook

The text book will be '*Catalysis, an integrated approach*', edited by Prof.dr U. Hanefeld and Prof.dr ir L. Lefferts, with contributions from many experts.

### Test

There will be a test early 2018, location t.b.a. The test is obligatory for NIOK graduates. There are a number of requirements for obtaining the Certificate of Proficiency, one of them being completing the CAIA test. Consulting the text book during the test is permitted. ('open book test').

### Certificate

A *Certificate of Attendance* is available. A *Certificate of Proficiency* is available for those who successfully took the test. Obtaining the Certificate of Proficiency is one of the requirements that need to be met before NIOK graduates can apply for a NIOK diploma accompanying their doctor's degree certificate. For the complete set of requirements please contact the NIOK office or ask your supervisor.

### Registration

The (pre) registration form for the course can be found via NIOK website [www.niok.nl](http://www.niok.nl). The number of participants is limited to 55.

### Course fee

The course fee amounts

	Registration before Sept 15, 2017	Registration after Sept. 15, 2017
Graduate students and postdocs working with NIOK members	€ 650	€ 750
All other graduate students and postdocs	€ 1000	€ 1100
All other participants*	€ 2800	€ 3000

\* VIRAN members can send one employee of a member company's own staff at a reduced rate of € 650/750

The fee includes:

- (full board) accommodation (19 November arrival, 24 November departure);
- a copy of the book '*Catalysis, an integrated approach*';
- other course materials and hand-outs.

### Cancellation fees

Cancellation fees are applicable:

- cancellation between 23 October – 8 November: 50% of the course fee.
- cancellation after 8 November: the full fee will be charged.

### Course leader

Prof.dr ir L. Lefferts

### Contact

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### Hotel van der Werff Schiermonnikoog

