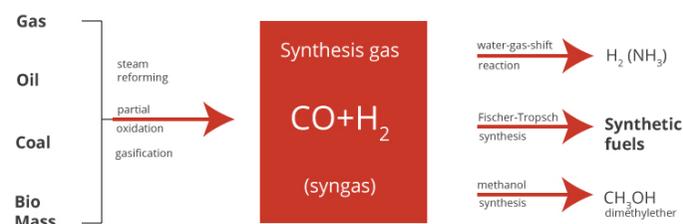


## Our Vision on Clean Coal to Liquids

Eventually, all energy will have to come from sustainable sources, i.e. the sun. In the transition period, which is likely to last several decades, energy from fossil sources will continue to be used on a large scale.

Liquid fuels such as gasoline and diesel are desirable as medium for storing and transporting energy: Their energy content per unit of volume and weight is unsurpassed, and the necessary infrastructure is widely available. Technologies for converting gas, biomass and, not in the least, coal into synthetic fuels (coal-to-liquids) are therefore attractive options. Synthesis gas (syngas; a mixture of carbon monoxide and hydrogen) is the key intermediate in all these conversions.

Clean Coal-to-Liquids (CTL) technology is greatly preferable to direct and distributed combustion of coal, as toxic impurities can (and have to) be removed in syngas generation. The challenge of CTL is the addition of hydrogen for syngas ratio adjustment without extra CO<sub>2</sub> generation; mastering this reduces the carbon footprint to the level of GTL technology.



On the long term, syngas derived from CO<sub>2</sub> and solar H<sub>2</sub> offers the perspective of a sustainable route to non-fossil fuels, keeping the energy density and convenience of today's transportation fuels. Fundamental knowledge and well trained people form the key ingredient for optimizing these technologies.

Contact  
Prof. Hans Niemantsverdriet, Director  
Antonio Vaccaro, Office Manager  
TU/e Campus, Helix, STW 3.49, Den Dolech 2  
5612 AZ Eindhoven,  
The Netherlands  
P +31 40 247 8569  
E office@syngaschem.com  
www.syngaschem.com

## Vacancies

**Syngaschem BV is seeking applications for multiple positions in relation to SynCat@Beijing and its various research lines. SynCat@Beijing is a brand-new research facility in Beijing area which will be launched 2015 in collaboration with Synfuels China Technology Co., Ltd.**

### Research Scientists (multiple openings)

*(senior and junior postdoc level)*

Successful candidates have a strong experimental background, an excellent academic track record, a keen interest in fundamental catalysis, and the willingness to cooperate in multidisciplinary teams.

Expertise in heterogeneous catalysis, surface science, and transmission electron microscopy is as welcome as expertise in homogeneous catalysis, photocatalysis and electrocatalysis.

At a senior level, they are expected to set up research and lead a small research team in the new laboratory. At a junior level, they will join one of the research teams.

### Technicians UHV equipment (several openings)

### Operator Transmission Elektronmicroscopie (two openings)

Technical support in terms of operating, maintaining, and repairing our equipment is vital for advancing our program. Pushing the boundaries in the methods of surface science requires creative solutions from hands-on people with technical skills, as well.

Successful candidates have either a couple of years hands-on experience using UHV or TEM equipment already or a keen interest in learning this expertise based on a solid education in applied physics or engineering.

Candidates should be willing to work in China for at least 3 years. Candidates with M.Eng, M.Sc, or Ph.D. degree are equally encouraged to apply. Ability to communicate in English is crucial.

### We offer

A possibility to grow. A lasting place in a vast network of ambitious scientists. A highly competitive salary package.

### How to apply?

Check out [www.syngaschem.com](http://www.syngaschem.com)

Syngaschem BV is a private company with liability limited by shares and a subsidiary of CatPhysChem BV. Syngaschem BV is registered at the Dutch Chamber of Commerce under number: 57986630



## A New Laboratory for Fundamental Catalysis in Beijing



## SynCat @ Beijing

The Synfuels China Laboratory for Fundamental Catalysis  
Science & Technology for Clean Fuels from Coal

## Our Activities

Syngaschem BV engages in fundamental research on the catalytic conversion of syngas into clean, synthetic fuels. Syngaschem BV is proud to have one of the leaders in Clean Coal-to-Liquids, Synfuels China Technology Co. Ltd, as its major partner.

In 2015, Syngaschem BV and Synfuels China Co. Ltd. will open a brand-new catalysis laboratory, called SynCat@Beijing. Equipped with state-of-the-art surface science and catalysis research tools, this place will provide an excellent breeding ground for scientific talent and synergetic collaboration.



Iron-catalyzed Fischer-Tropsch synthesis (FTS) forms the main focus of our research. Understanding, how the catalyst composition on the atomic scale relates to the mechanism of the reaction, as well as the catalyst's activity, selectivity and stability is our key to take the lead in FTS research and to lift CTL technology up to a higher level. In addition there will be programs on sustainable  $H_2$ ,  $CO_2$  chemistry, FTS product work-up and on methods development.

Syngaschem BV is presently recruiting young research scientists with leadership potential, who are expected to play a leading role in the SynCat laboratory at Beijing. We invest in our researchers by offering high quality educational program on fundamental catalysis, surface and material science, as well as a training program aimed at scientific leadership.

Not in the least, Syngaschem BV also collaborates with high-level University groups all over the world (Cardiff, Aarhus, Stanford, Cape Town, DTU Lyngby, Singapore, and others).

## Our Research

The first major research program at SynCat@Beijing is aimed at the surface chemistry of Fe FT catalysts in their working – carbidic – state. It ranges from catalyst preparation, formulation, characterization and testing as it is commonly done in a professional industrial laboratory, via surface science of nano particles and single-crystals to molecular modeling by computational methods.

### Iron Fischer Tropsch Catalysts in Action

= Main Research Program



+ activity on sustainable hydrogen production -  $CO_2$  avoidance  
+ activity on product work up (wax to gasoline; specialty products)

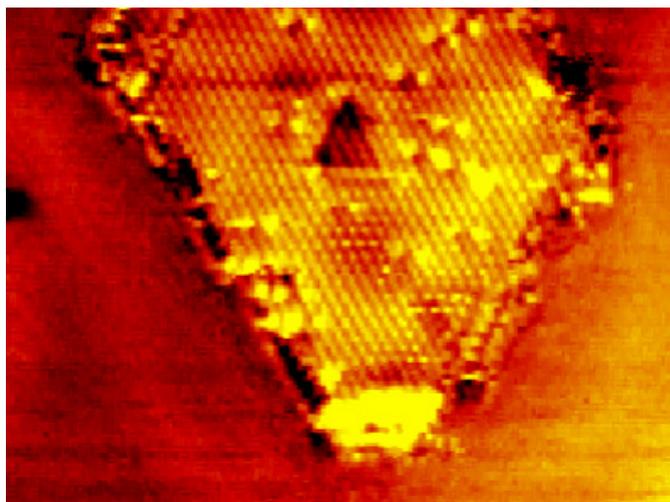
In situ techniques  
Synchrotron studies  
Electron Microscopy  
Catalyst Testing & Kinetics

Scanning Probe Techniques (STM, AFM)  
In situ and fast XPS; Reflection-FTIR

TPD, LEED/AES, UPS  
RAIRS, Work functions

(part of)  
DFT, AIMD; Monte-Carlo

The large distance between the worlds of applied catalysis and the extremely simplified situations dealt with in molecular modeling will be bridged by (a) studies of planar model catalysts consisting of well-defined nanoparticles on planar supports which greatly simplifies the assessment of the catalyst's morphology, structure sensitivity and deactivation processes; and (b) studies of the surface chemistry of iron and carbidic iron, which serve to validate the results of DFT studies and offer a better basis for understanding reaction mechanisms.



## On Scientific Leadership

Syngaschem BV invests in its researchers by providing a scientific leadership training program designed for ambitious young scientists who want to become leading, accountable professionals in research and education in their future careers.

The core of the program is directed at being able to take on accountability based on powerful self-leadership qualities. The inner circle around the core aims at performing responsibly in a balanced way, based on solid self-management qualities. The outer circle is directed at developing and training personal competences and skills, like presenting, publishing, motivating, team-building, planning, fund raising and many other qualities.



Mastering self-leadership and self-management helps one to utilize competences and skills in a natural way. Personal strengths grow, when personal hurdles can be overcome. Persons who develop self-leadership and self-management capabilities simultaneously develop skills for becoming a renowned scientist, a successful manager and leader of their future students. Syngaschem closely collaborates with Jan-Karel Felderhof, an acclaimed expert on self-leadership.