

The research consortium on  
**Solar Nitrogen Fixation**

formed by the groups of V. Artero (CEA Grenoble, France), C. Bostedt and M. Chergui (EPF Lausanne, Switzerland), V. Krewald (TU Darmstadt, Germany) and S. Schneider (University of Göttingen, Germany) is inviting applications for two PhD and two postdoctoral positions.

The aim of the consortium is to evaluate strategies for the development of molecular catalytic systems that use solar energy to convert nitrogen into ammonia, based on a mechanistic analysis of state-of-the-art  $N_2$  photoactivation complexes. Several approaches will be examined to design platforms that facilitate photodriven  $N_2$  splitting and proton coupled electron transfer for N–H bond formation, which define the thermochemical bottlenecks of nitrogen fixation. The successful candidates will work in close collaborative exchange between the involved groups with expertise in synthetic inorganic chemistry, electrochemistry, ultrafast spectroscopy and computational chemistry.

Each position has individual criteria and requirements. Please note that the administrative details, starting dates and application deadlines are specific to each position.

**1 Postdoc position in ultrafast spectroscopy of inorganic complexes** in the groups of Prof. Dr. Majed Chergui and Prof. Dr. Christoph Bostedt

**Description and requirements.** The candidate will work on ultrafast optical and free-electron laser experiments on molecular catalytic complexes and reference molecules. The optical experiments are performed in the LACUS laboratories at EPFL (Lausanne). The Lausanne lab offers a broad range of experimental strategies such as ultrafast transient absorption and 2-dimensional spectroscopy in the visible to the deep-UV, ultrafast fluorescence up-conversion, ultrafast photoelectron spectroscopy of liquid solutions and ultrafast circular dichroism. The ultrafast X-ray spectroscopic studies will be carried out at the Swiss Free Electron Laser (SwissFEL), at the Paul-Scherrer-Institut (PSI) in Villigen. The new soft x-ray branch will offer few- to sub-femtosecond x-ray pulses as well as two-color capabilities from 250 to 1800 eV. The new Maloja endstation, currently under construction, will offer opportunities for ultrafast x-ray spectroscopies in the soft x-ray regime in the gas, liquid, and solid phase. The candidate will participate in developing strategies for ultrafast spectroscopy at free-electron laser sources with a focus on nitrogen containing molecular complexes. Solid knowledge of ultrafast laser spectroscopy and/or X-ray spectroscopy are expected, along with a motivation to high risk experiments.

**Administrative details:** The position is based in the Laboratory for Ultrafast X-ray Sciences at Ecole Polytechnique Fédérale de Lausanne (EPFL). The optical laser experiments will be performed in the LACUS laboratories at EPFL but frequent travel to the free-electron laser facility at Paul Scherrer Institute in Villigen or other XFEL sources must be expected. The position is limited to three years. Interested candidates should submit CV, motivation letter and the contact details of two referees to Prof. Christoph Bostedt by e-mail (christoph.bostedt@epfl.ch) quoting the reference *SolarN<sub>2</sub>*.

**Available from:** 01.05.2020

**Application deadline:** 01.04.2020

**1 PhD position in computational inorganic chemistry and theoretical spectroscopy** in the group of Prof. Dr. Vera Krewald

**Description and requirements.** We are looking for a candidate who is keen to study intriguing electronic structures and (photo-)chemical reaction mechanisms in the context of light-driven nitrogen fixation using a variety of quantum chemical tools. The successful candidate will evaluate thermodynamic, kinetic and spectroscopic properties of selected inorganic complexes synthesized in the Artero and Schneider laboratories with state-of-the-art computational methodologies. Their excited state relaxation behaviour will be studied computationally and analysed in close collaboration with the experimental measurements from the Chergui and Bostedt laboratories. The candidate should have a university undergraduate degree in chemistry or a related field. Good knowledge of transition metal chemistry, homogeneous catalysis and/or photochemistry are expected. Experience in operating a Linux computing environment and basic programming skills may be helpful but are not expected. The role includes teaching contributions in theoretical and computational chemistry.

**Administrative details.** The position is advertised as a fixed-term contract of three years. Opportunity for further qualification (doctoral dissertation) is given. The fulfillment of the duties likewise enables the scientific qualifications of the candidate. The Technische Universität Darmstadt intends to increase the number of female employees and encourages female candidates to apply. In case of equal qualifications, applicants with a degree of disability of at least 50 or equal will be given preference. Wages and salaries are according to the collective agreements on salary scales, which apply to the Technische Universität Darmstadt (TV-TU Darmstadt). Interested candidates should submit enquiries and their application (motivation letter, CV, contact details of two references) to Prof. Dr. Vera Krewald by e-mail (krewald ,at' chemie.tu-darmstadt.de) quoting the reference *SolarN<sub>2</sub>*.

**Available from:** 01.05.2020

**Application deadline:** 31.03.2020

**1 PhD position in synthetic inorganic chemistry** in the group of Prof. Dr. Sven Schneider

**Description and requirements.** We are looking for a highly motivated candidate to work on photochemically driven activation and fixation of dinitrogen. The successful candidate will synthesize transition metal complexes of the heavy group 7-8 metals with functional pincer ligands to evaluate strategies for photochemical nitrogen fixation. Experience in standard techniques for the synthesis (glove box and Schlenk technique) and spectroscopic characterization of air-sensitive coordination compounds are required as documented by an M.Sc. degree in a relevant field, such as organometallic chemistry and/or homogeneous catalysis research. Experience in organic ligand synthesis, small molecule activation and transition metal pincer chemistry are highly advantageous. You are proficient in German or English and have to be willing to carry out the project as part of an international team and in close collaboration with the external collaborators of the consortium.

**Administrative details.** The Ph.D. position is based in the group of Prof. Dr. Sven Schneider at the Department of Chemistry, Georg-August-Universität Göttingen, Germany, with 50% (alternatively: 67%) of the regular working hours (currently 39,8 hours per week) with a limited contract of at least 3 years. The salary level follows E13 (TV-L). The University of Göttingen is an equal opportunities employer and places particular emphasis on fostering career opportunities for women. Qualified women are therefore strongly encouraged to apply

in fields in which they are underrepresented. The university has committed itself to being a family-friendly institution and supports their employees in balancing work and family life. The mission of the University is to employ a greater number of severely disabled persons. Applications from severely disabled persons with equivalent qualifications will be given preference. Interested candidates should submit CV, motivation letter and the contact of two referees to Prof. Dr. Sven Schneider by e-mail (sven.schneider 'at' chemie.uni-goettingen.de) quoting the reference *SolarN<sub>2</sub>*.

**Available from:** 01.05.2020

**Application deadline:** 31.03.2020

**1 postdoctoral position in synthetic inorganic chemistry and electrochemistry**, in the group of Dr. Vincent Artero

**Description and requirements.** We are looking for highly motivated candidates interested in the development of molecular based photoelectrocatalytic systems for dinitrogen reduction. The successful candidate will be in charge of a) the synthesis of transition metal complexes of the group 6-7 metals bearing functionalized pincer ligands, b) their assembly with selected photosensitizers, c) the evaluation of the potential of the obtained assemblies for driving direct nitrogen fixation through photoinduced proton coupled electron transfer processes. We are looking for candidates with a PhD in inorganic chemistry with good experience in organic synthesis and coordination/organometallic chemistry (synthesis under inert atmosphere, characterization of metal complexes, reactivity studies). A practical experience in electrochemical techniques applied to molecular systems will be an asset, and knowledge in basic molecular photochemistry and or photocatalysis will be advantageous. The successful candidate will be part of an international research program and is expected to be fluent in English. Short-term stay in the partners' labs may be offered during the course of the project.

**Administrative details.** The postdoctoral position is based in the group of Dr. Artero in the Laboratoire de Chimie et Biologie des Métaux (UMR 5249 Univ. Grenoble Alpes – CNRS – CEA), at the CEA Grenoble, France (<https://www.solhycat.com>; <http://www.cbm-lab.fr/Pages/SolHyCat/Presentation.aspx>). We offer a 1(+1) year(s) fixed termed post-doctoral CEA contract. The applicant should not be older than 30 and hold her/his PhD for less than 2 years at the starting date. Wages and salaries are according to the collective agreements on salary scales, which apply to CEA. Interested candidates should submit CV, motivation letter and the contact of two referees to Dr Matthieu Koepf by e-mail (matthieu.koepf'at'cea.fr) quoting the reference *SolarN<sub>2</sub>*.

**Available from:** 01.10.2020

**Application deadline:** 01.07.2020