



Universiteit
Leiden
The Netherlands

Spin-label EPR Approaches to Protein Interactions

Son, M. van

Citation

Son, M. van. (2014, December 4). *Spin-label EPR Approaches to Protein Interactions*. *Casimir PhD Series*. Retrieved from <https://hdl.handle.net/1887/29986>

Version: Not Applicable (or Unknown)

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/29986>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/29986> holds various files of this Leiden University dissertation.

Author: Son, Martin van

Title: Spin-label EPR approaches to protein interactions

Issue Date: 2014-12-04

CURRICULUM VITAE

Martin van Son was born on 9 January 1982 in Rotterdam, the Netherlands. After attending the Erasmiaans Gymnasium in Rotterdam, he studied chemistry at Leiden University. He completed research projects in coordination chemistry, solid-state chemistry, biophysical chemistry, and analytical chemistry, and graduated in August 2009. During his studies, he worked as a data processor at Fugro Aerial Mapping, which he continued afterwards. In May 2010, he started his doctorate research at the MoNOS group, Leiden Institute of Physics, under the supervision of dr. M. Huber and prof. dr. E.J.J. Groenen. His research was on protein interactions studied by electron-paramagnetic-resonance spectroscopy, the results of which are presented in this thesis.

As of August 2014, he is a lecturer in chemistry at the University of Applied Sciences in Leiden.

LIST OF PUBLICATIONS

H. Kooijman, M. van Son, S. Tanase, E. Bouwman, J. Reedijk, A.L. Spek: μ -oxo-bis{chloro[N-(2-methoxyethyl)-N,N-bis(pyridin-2-ylmethyl)amine-kappa (4)-N,N',N'',O]iron(III)}bis(trifluoromethanesulfonate) acetonitrile disolvate. *Acta Crystallographica Section E-Structure Reports Online* **61** (2005) M1042-M1044.

S. Tanase, M. van Son, G.A. van Albada, R. de Gelder, E. Bouwman, J. Reedijk: Self-assembly of extended structures through non-coordination intermolecular forces: Synthesis, crystal structures, and properties of metal complexes with 5-methyl-2-pyrazinecarboxylate. *Polyhedron* **25** (2006) 2967-2975.

G.J. Janssen, E. Daviso, M. van Son, H.J.M. de Groot, A. Alia, J. Matysik: Observation of the solid-state photo-CIDNP effect in entire cells of cyanobacteria *synechocystis*. *Photosynthesis Research* **104** (2010) 275-282.

M.H. Shabestari, M. van Son, A. Moretto, M. Crisma, C. Toniolo, M. Huber: Conformation and EPR characterization of rigid, 3(10)-helical peptides with TOAC spin labels: Models for Short Distances. *Biopolymers* **102** (2014) 244-251.

M. van Son, T.T. Zheng, P. Kumar, D. Valdink, J. Raap, A. Kros, M. Huber: Towards artificial membrane fusion: EK-peptides, the coiled-coil zipper. *Biophysical Journal* **106** (2014) 506A.

M. van Son, S. Lindhoud, C.P.M. van Mierlo, M. Huber: Equilibrium unfolding of flavodoxin from double electron-electron resonance distance constraints. *To be published*.

M. van Son, J. Schilder, P. Gast, A. Blok, M. Ubbink, M. Huber: The complex of cytochrome c with cytochrome c peroxidase studied by spin-label, multi-frequency electron paramagnetic resonance. *To be published*.

M. van Son, T.T. Zheng, P. Kumar, D. Valdink, J. Raap, A. Kros, M. Huber: Heterodimer formation of membrane fusion E/K-peptides studied by continuous-wave EPR. *To be published*.

ACKNOWLEDGEMENTS

Many people have contributed to the work that is presented in this booklet. I gladly mention them here.

I am most grateful to my doctoral supervisors, Martina Huber and Edgar Groenen, who allowed me to work and learn in the MoNOS group. They have taught me much about science, writing, and presenting. I carry their valuable lessons with me, whichever paths I shall tread in the future.

I wish to express my gratitude to the graduate students in the MoNOS group during the years that I was there: Maryam Hashemi Shabestari, Pravin Kumar, Faezeh Nami, and Gabriele Panarelli. I appreciated the experimental work we jointly performed, our discussions about EPR, and the laughter we shared. I was very fortunate that Silvia Sottini and Mykhailo Azarkh were working as postdocs in the group. Many times I knocked on their doors to ask them questions about EPR and other subjects. They were always prepared to share their knowledge with me. Big thanks to Matthijs van der Wild, who completed his bachelor's project in the MoNOS group. Matthijs performed the larger part of the DEER measurements that are shown in Chapter 5. I thank Henriette van Leeuwen and everybody else who has contributed his or her bit to the MoNOS group.

In 2011, Jos Disselhorst, Jan Schmidt, Huib Blok, Bert Crama, and Peter Gast joined forces to develop a new insert for the W-band spectrometer in order to improve its performance. The actual design and manufacturing of the insert was done by Harmen van der Meer. In December 2012, when the first tests were done, it became clear that the newly built insert outperformed the 'old' Bruker insert in all aspects. All of the W-band spectra presented in Chapter 3 were recorded with this new insert. I have greatly benefited from the development that was achieved by these experts.

I am thankful to Alexander Kros, Jan Raap, Tingting Zheng, Martin Rabe and Dayenne Valdink for their collaboration in the work of Chapter 2. I thank Marcellus Ubbink for allowing me to use the biochemical facilities of the Protein Chemistry group and for his collaboration in the work of Chapter 3. The biochemical work was uncharted territory when I started it. Luckily, I was aided by Marcellus's students: Qamar Bashir, Bharat Somireddy Venkata, Sandra Scanu, Jia-Ying Guan, Yoshitaka Hiruma, Wei-Min Liu, Jesika Schilder, Monika Timmer, and Simon Skinner. Special thanks to Anneloes Blok, whose constant support eventually led to a satisfactory labelling degree of cytochrome *c*. I thank Claudio Toniolo for his collaboration in the work of Chapter 4. Carlo van Mierlo and Simon Lindhoud are acknowledged for their collaboration in the work of Chapter 5.

It was a privilege to have the support of several technical departments. Hans van Kuyk is greatly acknowledged for supplying the liquid helium and nitrogen that I needed to do measurements at low temperatures. Gert Koning installed a new water pump needed to cool the EPR equipment. Ruud Kuyvenhoven and Arno van Amersfoort supported me whenever I needed help with computers. Frans Folst and Tom Jansen, the glassblowers at the Leidse instrumentmakers School, helped me with customized quartz tubes on numerous occasions.

It has been a joy to work with so many people within the Leiden Institute of Physics and the Leiden Institute of Chemistry. I am privileged to have met people from a large variety of cultures and I feel blessed that many of them have become my friends.