

## University of Groningen

### Photochromic molecular switches

Robertus, Jort

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2015

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Robertus, J. (2015). *Photochromic molecular switches: based on azaobenzenes, dithienylethenes and hemithioindigos*. [Thesis fully internal (DIV), University of Groningen]. [s.n.].

#### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

#### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

# Acknowledgement

I never imagined doing a PhD or a masters for that matter, but every time I thought I had reached the end of my studies, I met inspiring teacher(s), and because of them I am here now. Doing a PhD has given me the opportunity to do the things I feel passionate about, and through it I have met countless wonderful people from all over the world.

First of all I would like to thank my promoter, Prof. Ben Feringa. Dear Ben, thank you for offering me a PhD position and for giving me the space to pursue projects that I was interested in, even though the projects worried you sometimes. In the end this thesis has become a solid piece of work and I have enjoyed working on it. Now it's time to move on and develop other interests further.

Wesley, thank you for the many hours you spend on the chapters in this thesis, were it discussing, measuring, correcting or proof reading. Without you my thesis and my PhD would have looked very different. Although, you sometimes overcomplicate things, you have a knack to get things done and for getting the most out of people. Thank you for introducing me to Nano-FM, where I have enjoyed working very much.

I would like to thank Prof. dr. Frantisek Hartl, Prof. dr. Kingo Uchida and Prof. dr. Sijbren Otto for correcting and approving this manuscript.

Prof. dr. Jan B.F.N. Engberts, I have always enjoyed your lectures very much. Thank you for your thoughts on and correction of the Dutch summary and being a great neighbour. Dr. Edwin Otten, thank you for your help with the OTTLE cell and the measurements in the glove box. Dr. Armagan Kocer, thank you for proof reading the review upon which chapter 2 is based. Pieter, thank you for all your help with the (arrayed) NMR measurements, and taking the time to teach me how to get the best results out of these measurements. Martin, thanks for the many discussions we had over the years, be it chemistry related or not.

Steve Davey, thank you for all the mechanistic black board sessions over the years. Mike Pollard, you were a wonderful teacher, climbing partner and friend. Thank you both for giving me a passion for Organic Chemistry.

Dear Emma, thank you for being one of my paranymphs and for telling me to stop measuring and getting my bloody thesis done. It was the proverbial kick in the backside I needed. You always seem to be at the centre of the party, having one drink with you equals ending up in de Kar at six in the morning with a flaming shot in hand.

Jochem, Thank you for being my second paranymph. Although, I am certain you would argue that you are the first. We have worked side by side in the lab and office for four years. Experiencing the antics of you and Jurica has been a blast. The test tube incident is still my favourite by far, although we should not forget the gimp room.

This thesis is the result of several collaborations. Siebren Reker, and Albert Deuzeman, thank you for solving the equations in chapter 3 that were far beyond me, I was astounded by the speed with which the two of you broke down the problem.

Oleksii, I have always enjoyed working with you. You are very pragmatic and to the point. Thank you for taking the time to perform the Raman and electrochemistry experiments with me and of course for the beers we drank.

Wim “*dat vindt papa leuk*” Velema, we went to conferences, bars, dinners, parties, a hard style dance event and a boat trip. In between all of this madness we worked on a project together, thank you for your help on chapter 6.

Petra, thank you for the cryo TEM imaging you did for this thesis and for the many laughs you have provided willingly and unwillingly.

That brings me to my lab, 16.230 also known as the *plof kamer*. Thom, over the years we have worked together many times, we stood in the same lab and sat in the same office. I don't think I know anybody else with such a quick and sarcastic sense of humour. Office sports have been lifted to a new level. Who knew you could have jousting tournaments with office chairs. Thank you for all the contributions you made to this thesis and for being a wonderful guy.

Jurica, you are something else entirely. It took a while for you to get into your own, but once you did, we could not get around you. Being in the lab with you Thom, Jochem and Erik, sometimes felt like being in a mental ward. My PhD could have been much more efficient if you would not have been in our lab. But oh boy, would we have missed a lot of epic moments. Thank you for all the fun you have provided, it is much appreciated.

Kuang-Yen, you are such a funny guy. It's been amazing to see you transform over the years. You started out as a quiet Taiwanese guy and grew out to one of the most vocal and direct people in the group. Even though subtlety is no longer in your playbook, you care a lot for the people around you and you are a good friend. Thank you for tolerating my office antics, in the same way I tolerated yours and for being a willing victim of Jos and my taping adventures. 祝: 好運小弟!

Erik, you were always in at seven and gone at four. In the morning you were one happy camper. That was until we changed the music to *het foute uur*. We all know you secretly liked it.

Giuseppe, I think we have said it all in your movie! You're a wonderful character. In the lab we have tried to continue in your fashion, explosions and all. I think we have succeeded very well.

Tom, I am happy that there is finally someone in 16.230 with a sense of humor. As a master student you needed very little guidance and now you have taken over the important task as lab assistant, I am sure you will do just as well as me.

Dear Nop, you were a silent rock, the calm in the storm that was 16.230. I am glad to have been a part of the dinners you hosted. You are an astonishingly kind person and a great cook!

Wen-Hao, thanks for sharing a love for Ardberg, Laphroaig, Lagavulin and great music. These are traditions that should be upheld in the future.

Jos, since your arrival in the C-wing the conversation during the lunch has become even more vulgar, and this is quite an achievement. It was fun to see you get hooked on climbing and route setting. I always enjoyed discussing climbing, holiday adventures and the occasional chemistry with you. I hope you and Esther will find a good place in Australia.

Dear Johan, you are the man of brilliant/borderline crazy ideas, both in- and outside the lab. Thanks for the many beers and dinners we had, visiting you in Australia has been a real highlight. I hope to visit you again in the future.

Cuchara, over the years we have talked many many hours, drank lots of coffee, beers, had BBQ's, dinners and strolled out of Café het Feest while it was light again. Thank you! You must have collected a massive number of spoons, you should expand your collection even further.

Dear Tatiana, you were a Spanish whirlwind that entered the lab. You are one of the kindest people I've met. You always have an ear for other people. Your parties equals a dress code be it Black and White, Sports party, fruits, 90's you did it all. Thank you for all the amazing parties, dinners, talks and lunches over the years!

Barbara, you were also always present at these events, but also at the group dinners and the German lunches. I am happy you also find so much joy in climbing and now my thesis is finished I hope to take you up on that Frankenjura trip.

Manu, thank you for having a good taste in music

There are many others that I would like to thank that made this period an unbelievable experience: Alena, Alex and Maggie, Raquel, Carlos, Uxue, Lubi, Toni C., Gosia, Gabor, Annika, Anouk, Ana, Ani, Sara C., Lorina, Nikki, Matt, Nuria, Steve F., Chris S., Nicki, Francesco, Diderik Dorus Céline, Manuel, Arjen, Hella, Seb, Claudia, Tilde, Xavier, Luca, Derk-Jan, Alejandro, Davide, Daniele, Toni, Alessio, Toni, Appu, Adi, Pablo Ivana, Peter, Bas, Tieme, Felix, Fiora, Franscesca, Kostas, Filippo, Bin, Greg, Hans, Heloise, Hugo, Martin, Sander, Ewold, Jack, Jaiwen, Jet, Johannes, Johnny, Jeffrey, Lachlan, Pieter, Tim, Lili, Romina, Lumi, Luuk, Manolo, Bjorn, Rienk, Maria, Massimo, Matea, Krzysztof, Mathieu, Miriam, Nata, Nuria, Sara R. D., Paula, Pat, Piotr, Rik, Robby, Saleh, Santi, Ruben, Shaghayegh, Stefano, Suresh, Takashi, Thomas, Tim, Valentin, Wiktor, Xiaoyang. I should also thank; Dirk, Davide, Francesca, Inge, Toon, Martin, Lavinia, Mathijs, Richard van D., Richard J., Robert, Jan, Koen, Jaap, Ate, Bas, Tieme, and Rob for creating an awesome atmosphere back in the day. Further, I would like to thank; Adri, Alphons, Anna, Ebe, Evert, Cristina, Gerard, Hans, Hilda, Tati, Suzy, Theodora, Ben Bakker, Ben Bosma, Johan, Tineke, Wim, Jur Rene, Menno, Annemarie, Edith and Erna. I have probably forgotten many other, you will have to excuse me for my forgetfulness!

That brings me to my other passion Bouldering. Bert, Tjitze and Govert setting up and building Gropo Bouldergym with the three of you has been an amazing experience. I am looking forward to the continuation of this project. I would like to thank all the people who were involved, thank you all!

I would like to thank Huize Vismarkt, Jeroen, Maartje, Mark, Priscilla, Erik, Tony, Berber, Bas, Steven and Eva, you have made this house special.

I would like to thank so many other friends that I could quite simply fill another thesis, so here are a few; Sanne, Björn, Alwin, Riemer, Nienke, Jim, Saar, Martijn, Caspar, Marleen, Ingmar, Gineke, Anke, Jort α, Bob, Alco, Jelmer, Leendert, Chris, Lara, Lisa, Nick, Taylor, Sara J. M., Karlijn, Bego, Sara, Andreas, Jildou, Ray, Harmen, Nathan, Robin, Emiel, JW, AJ, Guru, Gup, Ad, DJ Aplat, Mark, Vera, Yogi, Leonidas, Sander, Jesse, Karlijn, Simon, Karla, Eli, Harold, Judith, Kim, Ivan, Wilma, Reinder, Jules, Lisa R. Liesa, Juri, Joris, Eline, Michel, Freek, Marlon, Jessica, David, Astrid, Wout, Julia, Thijmen, Flip, Eef, Herman, Jeroen, and Martin.

Derk, since we met many years ago we have been friends. Twenty years ago we started climbing and we are still at it, that calls for a celebration. Thank you for all the fireside talks, early farm mornings, coffee at huize vismarkt, many crazy climbing trips and so much more. I am sure we will have many more of these things and that we will never stop climbing. Dear Marit, you are the other fixture in my life, and it's great to see the two of you together. Thank you for your lovely happy smiles and the loving hugs over all the years! You are a wonderful person, Thank you!

Arjan, “*de held*”. I never realized how true that nickname would become. Thanks for staying calm in Annot. We have gone on many bouldering trips over the years, even though one of us always seemed to be injured. Still, I think there were way to few trips and this should be corrected! We don’t always agree, and sometimes we have heated discussions, but they always dissipate quickly over a few beers. Thank you for all the good times! I think it is very fitting you will defend your thesis one week before me.

Finally, I would like to thank my family for all the support, for putting up with me during this period, and for understanding that sometimes you need to do lab work in the weekends, nights and during holidays.

To come full circle I will end this dissertation with a perfect description of a place that is very special to me, and where I started my PhD. My home away from home.

*“The charm of Fontainebleau is a thing apart” ...  
“There is no place where the young are more gladly conscious of their youth,  
or the old better contented with their age.”*

*Form across the Plains by A R. L. Stevenson.*