Acknowledgements

A PhD is not easy to do. Many things that can fail during the process will fail. However, a PhD becomes significantly easier with the help of other people and it can result in many positive results and nice memories. I would like to use this opportunity to express my appreciation all of those who I share those memories with.

First of all, I would like to thank my promotor Prof. Katja Loos, for letting me join her group and work on this interesting topic, relatively new for both of us. Katja, thank you for your support, flexibility and all the freedom you gave me during my research and for having the confidence that I can successfully finalize this project. I am glad you believed I can give a presentation at Chains on short notice and teach the MMC course tutorials. I learned a lot from those experiences, which is something I really appreciate. I am also very grateful for all the time you took, to read and correct all the papers, but also for supporting me in finishing my thesis in the fastest possible way, and for constant help with job hunting.

I would also like to thank my co-promotor prof. Gerrit ten Brinke. Your lessons in Polymer Physics during the PTN course were invaluable for understanding this whole topic. We met only a few times, but you were always supportive and encouraging to me.

My sincere thanks go to the members of the reading committee: Prof. Bruno Ameduri, Prof. Francesco Picchioni and Prof. Guus Rijnders. Thank you for taking the time to evaluate this manuscript and for providing me with valuable comments.

The work described in this thesis and many related publications could not have been possible without the valuable contributions of many people. I am especially grateful to my every day collaborator through all four years of my PhD, Niels. Niels, thanks for all the discussions we had, for being constant source of new ideas and for helping me every day, especially at the beginning of my PhD with improving chemistry lab skills, since I barely had any. I don’t think this thesis would have ever been on such a high scientific level without you. Working with you has shown me that teamwork is invaluable in doing research. I wish you all the best in the future. This thesis would hardly contain any deconvolution graph if it had not been for Giuseppe Portale. Giuseppe, thank you for your constant interest in my work and your feedback on the co-authored articles, for helping me to understand all those SAXS and WAXS data we collected and how to use them to better understand our materials. I am especially glad for the collaboration we had together outside this research project on ion conducting fluorinated block copolymers. I owe special thanks to Prof. Beatriz Noheda and Monica Acuautla for their help to understand the ferroelectric behavior of our polymer
materials and for making ferroelectric measurements less challenging. Monica, thank you for explaining to Niels and me how to perform loop measurements in detail and for your help to solve all technical issues we had with our measurements. Almost all the SAXS and WAXS results from this thesis were acquired during many visits to the Dutch-Belgian beamline (ESRF, Grenoble, France). Special thanks go to Daniel Hermida Merino and Sarah Saidi for their patience in explaining for the n-th time how to run the measurements, for being available during night shifts or weekend and for measuring samples for us when we did not have the beamtime. I am also grateful to Evgeny Polushkin for his help during the SAXS measurements in Groningen that helped me to finalize Chapter 4 of this thesis and for a thorough explanation of the shear alignment experiments using tooth rheometer. I would also like to acknowledge Marc Stuart for his training and his assistance on TEM, Jacob Baas for his help with measuring magnetic properties of my nanocomposites and Prof. Ryan Chieci for his permission to use the microtome and the metal vapor deposition machine. A special thank you goes to Yanxi Zhang for explaining to Niels and me the metal deposition process and always providing me with the key for a microtoming room. And, of course, for his contagious laugh.

During my PhD project I had a chance to supervise only one student, but I find that experience quite valuable. Harm Hendrik Mellema, thanks for all the hard work you put in the projects we did together (they were all successful), for constantly cleaning the memory of my computer so it can work again, for interesting lessons on Dutch history and mostly for not refusing to talk Dutch with me and for preparing me for my first presentation in Dutch. It was my pleasure working with you, and I wish you all the best in the future.

I am also extremely grateful to the people responsible that the work in the lab always runs smoothly, Albert Woortman, Gert Alberda van Ekenstein and Jur van Dijken. Albert, thank you a lot for all those GPC measurements you performed (even when I had only one sample) and especially for teaching me how to run the measurements myself in case you were on vacation. In addition, thank you for always trying to find a solution for my technical problems and for having the best table at lunch. Gert, even though you were in the group only during the first year of my PhD, I am thankful for your quite important help with the DSC, TGA and POM measurements and valuable advices.

For the research that did not find its place in this thesis but I hope will be published soon, I would particularly like to thank Mustapha Abdu-Aguye and Prof. Maria A. Loi from the Photophysics and Opto-Electronics group for our collaboration on ferroelectric-semiconducting block copolymers for solar cells, Shashi Poddar and Prof. Alain M. Jonas from the University of Louvain for the PFM measurement on thin films block copolymer devices and Pedro Martins and Prof. Senentxu Lancers-Méndez from the University of
Acknowledgements

Minho for trying to measure the dielectric constant of our polymers and for performing magnetoelectric coupling measurements on multiferroic nanocomposites.

Also, I would like to thank prof. Katarina Jeremić for motivating me to do a PhD in Katja’s group in Groningen.

I am very grateful to all the current and former members of the Macromolecular Chemistry and New Polymeric Materials (MCNPM) group for making the work easier, and for a nice and cheerful working atmosphere. Special thanks to Karin (C. J.) Woudstra for being the driving force of the group. Karin, thanks for all the joy and good spirit you are spreading around, for all your help with many different things, your support, advice and our frequent chats.

I would also like to thank the special Indonesian duo, Dina and Masyitha, for a constant supply of food and sweets and their contagiously good mood. Dina, thank you for designing the cover of this thesis and many other figures inside the thesis and for doing XRD measurements for me. Sorry I always had something new to add to the picture. Masyitha, you are the only one in the group who believed in my singing abilities. Thanks as well for sharing new movies, songs, weird drinks (bubble tea) and websites for movie streaming with me. I hope I will get that wedding invitation soon. Anton(io), thanks for all the advice related to the RAFT and block copolymer self-assembly and for passing knowledge of microtoming and shear alignment on to me. I am glad you trusted me enough with cutting your samples and that the work from our collaboration got published. It was a pleasure to work with such a great scientist (😊😊😊).

Jin, I admire your hard work and dedication that you put into your project, and the persistency to finish it, despite all difficulties you had. I am also grateful to you for teaching me how to use AFM and spin coater, and for all detailed answers on my questions related to the ferroelectric and magnetic measurements. I hope you will soon celebrate your graduation. Vincent, thanks for helping me at the beginning of my PhD studies and for constant interest in my work during the last four years. Your thesis was a valuable source of information for me. Judith, I am highly grateful for all those sweets you shared with me when I emptied Dina’s and Masyitha’s drawers, and for all information about the peer-review process of papers. Jingjin Dong, thanks for being a good officemate and lab-mate and for measuring GI(S)WAXS samples for me. I am also grateful to my lab-mates Qiuyan, Marco and Milad. Dear Qiuyan, we maybe had problems in communication at the beginning, but afterwards I really enjoyed working and chatting with you. I admire your courage and determination to finish PhD far from your family and your kind personality. I hope everything is going great in China. Marco, thanks for being a good company in the lab during many working weekends, for your constant interest in my work, and life lessons you shared with me. Especially thanks for all impedance measurements you did with Nanda. Milad, I am grateful for performing the rheology measurements on ion conducting block copolymers for me. In a random order I would like to thank you all from MCNPM and Polymer
Acknowledgements

Chemistry and Bioengineering groups for good time during work and at conferences: Peter, Azis, Apostolos, Yassaroh, Csaba, Pia, Yi, Jakob, Jessica, Pavlo, Eliza, Karolin, Salomeh, Maho, Piet (Tjonge, jonge, jonge!), Indra, Nanda, Rahul Sasi K, (P)Abraham, Laura, Annemarie, Mónica, Avishek, Chao, Gurudas, Mark, Chlòe, Kai, Lifei, Qing, Maryam, Aldo, Qi, Chongnan, João Paulo, Nick, Clemens, Thomas, Marjon, Abednego, Kseniya, Giovanni, Katharina, Dennis, Viviana, Myleidi, Isotta, Claudio and all the others I forgot to mention. Prof. Andreas Herrmann, Bart Crielaard and newly arrived Prof. Marleen Kamperman, thank you for keeping a pleasant work atmosphere.

The atmosphere outside the work is just as important as the work and collaborations themselves. Special thanks go to Martijn, my paranymph No. 1. I can only imagine how annoying I was every morning asking you “How are you, Martijn?” 😊😊😊. Firstly, thank you for translating the summary of this thesis to Dutch. Thank you also for all organic chemistry tips and theoretical and practical knowledge you shared with me. Most of all, thank you for all the fun we had outside the lab. I enjoyed our dinners in “5 Smaken”, long talks about every possible topic, being kicked out of “De Drie Gezusters” multiple times (I really think we should get a Membership Card) and our music performances with glasses and bottles. Thank u, next (next) 😊😊😊.

Next, I would like to thank to our not so big “GROBalkan” community in Groningen. Many of them already left Groningen many years ago, but the new people continue coming, so the fun is always there. Deki and Sonja (cimeri), thanks for offering me to stay at your place at the beginning of PhD, so I could find an apartment. Thanks for introducing me to other people and for your care and support from Norway. Jelena and Saša, you welcomed me (together with the flood) in Groningen and brought me to the pub (after cleaning the apartment). Thanks for that and for all the chats and drinks we had together. Primož, I enjoyed working on our small scientific project and many beers we had, even though I was mostly drinking ice tea. Mirka (i Miloše i Filipe), thanks for being a mother figure to us in Groningen😊 and for pushing me to speak Dutch. Tetka (Irena), ti si carica! I am happy I found a companion for singing Serbian music and discussing celebrity rumors. „Hej, samo da mi je, hladne vode sa Romanihe...“. It is a pity you did not come to Groningen earlier. Special thanks go to Srđan, my paranymph No. 2. Firstly, thank you for correcting English on every page of this thesis and for helping me re-write some parts of it. Thanks for being a private apotheek, for all the meals you prepared, for all the dinner, lunch and brunch we had together. I am grateful to you for listening to my complaints on a daily basis and not being annoyed, as well as for the advice I got from you. Sorry for all embarrassments from Tetka and me during our riff offs at public places. Big thanks to all the other Balkan people for all the nice time we had together: Ana, Maja, Brana, Graeme, Vibor, Kaća, Jelena Ć., Slobo, Jelena P., Aida. “Vi lutate, bebe” 😊😊😊.
My old Serbian friends: Milena, Ljerka, Nevena, Pešić, Tijana, Danka, Filip, Nidžo, Maca B. and Maca I., thank you for Skype calls, messages and of course for fun we had.

Most of all, I would like to thank my family for being a constant source of love and support. Mama, Tata, Bumbo (i Baltazare), hvala vam što me trpite sve ove godine i za podršku koju dobijam od vas. Voli vas vaša Beba (Čicko)!

-Ivan-