Acknowledgements

This thesis concludes my four years of PhD studies at the University of Groningen and of course I would like to thank and acknowledge all the kind people who have been involved, professionally and personally.

First and foremost, I would like to thank my supervisors Bart J. Kooi and George Palasantzas for our time together in the Nanostructured Materials and Interfaces and the Surface Interactions and Nanostructures groups. Bart, bedankt voor de mogelijkheid om een promotieproject onder jouw supervisie te kunnen doen en het vertrouwen in mij dat ik het tot een volwaardig einde zou kunnen brengen. Ik heb veel inspiratie opgedaan aan onze gesprekken waarbij je heel nieuwsgierig, enthousiast, maar ook ontzettend nuchter was. George, I found it inspiring how you were dedicated to connect with students during your projects, as well as your courses. This was particularly clear to me when following Electronics, the FIT internship and the bachelor research project, which is how I got into the groups. I also enjoyed your conversations on politics, certain types of airplanes and car maintenance.

I would also like to thank the members of the reading committee, Beatriz Noheda, Tamalika Banerjee and Ritesh Agarwal, for their careful reading of the thesis and providing me with valuable comments such that it could considerably be improved.

The work described in this thesis and many related publications could not have been possible without the valuable contributions and teamwork of the partners participating in and around the PASTRY consortium. I particularly thank Jos E. Boschker, Ruining Wang, Valeria Bragaglia, Stefano Cecchi, Eugenio Zallo and Raffaella Calarco from PDI Berlin, Felix R.L. Lange, Antonio M. Mio, Henning Hollermann and Matthias Wuttig from RWTH Aachen University, Barbara Casarin, Antonio Caretta and Marco Malvestuto from Elettra Sincrotrone Trieste, Xiaoming Yu and John Robertson from the University of Cambridge, Andrea Redaelli, Enrico Varesi and Mattia Boniardi from Micron Technology and Marcel A. Verheijen from the Eindhoven University of Technology.
From our research groups I particularly like to thank our technician Gert H. ten Brink for always being available if something goes wrong. I also appreciated your honesty, direct way of approaching people and discussions about societal issues. Paul A. Vermeulen and Bin Chen are thanked for always being there in the office for discussions. I am happy to have collaborated with you and I am inspired by your ingenious and self-reliant way of experimenting. Also from the groups I thank Orcun Ergincan, Mehdi Sedighi, Vitaly B. Svetovoy, Lijuan Xing, Van Lam Do, Xukai Zhang, Zahra Babamahdi, Weiteng Guo, Sytze de Graaf, Joost Calon, Jefta Mulder, Taco de Wolff, Peter Jan van het Hof and Atul Kumar. It has been a really pleasant and joyful time.

For the research outside the thesis project I particularly would like to thank Yingfen Wei, Pavan Nukala and Beatriz Noheda from the Nanostructures of Functional Oxides group, Daniel M Balazs and Maria A. Loi from the Photophysics and Opto-Electronics group and Jin Xu and Katja Loos from the Macromolecular Chemistry and New Polymeric Materials group for the insight into their nice research projects and interesting collaborations. David Vainchtein, Graeme R. Blake, Jacob Baas, Johan G. Holstein, Martijn M. de Roosz, Václav Ocelík and Mikhail Dutka are thanked for their help and technical support and Paulus M. Bronsveld for his enthusiasm about everyone’s research. From the Faculty of Science and Engineering I also particularly thank Julius Janusonis and Evgeniya Salamatova, Björn Kriete, Leonid Solianyk, Dmitry A. Semchonok, Anil Kumar, Arijit Das, Tashfeen Zehra, Arjan A. Burema, Crystal Chen, Tom Bosma, Siddhartha Omar, Eric K. de Vries, Mallikarjuna Gurram, Jing Liu, Peiliang Zhao, Oleksandr Zheliuk, Xinkai Qiu, Arunesh Roy, Anna Bondarenko, Tenzin Kunsel, Soheil Solhjoo and Huatang Cao for their kindness and interesting conversations.

I thank the Top Master Nanoscience 2012-2014 cohort of which I have been part. Particularly Nilesh Awari and Alessio Pozzi are thanked for the joint time spent together during our studies. Also many thanks to Mustapha T. Abdu-Aguye, Sampson Adjokatse, Machteld E. Kamminga, Konstantin Balinin, Kumar S. Das, Koen Evers, Bo Sun, Gerjan J.J. Lof, Maria Azhar, Safdar Malik and Jos Teunissen for their conversations and discussions and many thanks to Caspar H. van der Wal,
Maxim V. Mostovoy, Tamalika Banerjee, Bart J. van Wees and Ra’anan I. Tobey for their teaching.


Ik wil ook mijn familie in Nederland bedanken, voornamelijk mijn moeder en vader omdat ze er altijd voor me waren. Из Москвы и Узбекистана я особенно благодарю бабушку, тёту Элеонору и Флору, Тимура, Ярославу, Малику, Гульнору, и Владислава. My family in the USA, including aunt Hamida, aunt Zarguneh, uncle James, uncle Ahmad, Sahar, Wali, Qayum, Hasti and Hamoon, are thanked for our time together. De familie Klamer en Mulder, met name Wim, Emmy, Tom, Jesse, Hennie en Gerrit worden bedankt voor hun steun. Als laatste wil ik Lisa K. Klamer bedanken, die in deze tijd het dichtst bij me stond en mij bij alles heeft bijgestaan.

Jamo Momand
September 5th, 2017
Groningen, the Netherlands
List of publications


List of presentations at scientific conferences


(8) Momand, J. et al. *Physics@Veldhoven 2017* Veldhoven. Controlling the epitaxy of 2D bonded Sb$_2$Te$_3$ and 3D bonded GeTe on Si(111). Poster presentation.