

Simon Kahmann

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Research focus: Functional materials for optoelectronics

My research connects the synthesis of novel semiconductors with their eventual application in optoelectronic devices. The core aim is to understand and to exploit the impact of nano-sized tailoring and chemical modification on the photophysical properties of materials processed from solution.

EDUCATION & DEGREES

Double Doctorate in Materials Physics/Materials Science , with distinction (1.0) ¹	2018
University of Groningen, The Netherlands Friedrich-Alexander University Erlangen-Nuremberg, Germany Advisors: Prof. Dr. Maria A. Loi, Prof. Dr. Christoph J. Brabec	
Master of Science in Nanotechnology , with distinction (1.1)	2013
Friedrich-Alexander University Erlangen-Nuremberg, Germany	
Bachelor of Engineering in Microtechnology , very good (1.5)	2011
University of Applied Sciences Zwickau, Germany	

PROFESSIONAL EXPERIENCE

Tenure Track Juniorprofessor in Experimental Semiconductor Physics	since 2023
Chemnitz Institute of Physics, University of Technology, Germany	
Early Career Fellow, Junior PI	2022-2023
Department of Chemical Engineering and Biotechnology (CEB), University of Cambridge, United Kingdom	
Research Fellow, Senior Postdoc	2021-2022
Cavendish Laboratory & CEB, University of Cambridge, United Kingdom	
DFG Research Fellow, Senior Postdoc	2019-2020
Zernike Institute for Advanced Materials, Groningen, The Netherlands	
Research Associate, Postdoc	2018
Zernike Institute for Advanced Materials, Groningen, The Netherlands	
Research Assistant, PhD student	2014-2017
Institute of Materials for Electronics and Energy Technology, Erlangen, Germany Zernike Institute for Advanced Materials, Groningen, The Netherlands	

HONOURS & FUNDING

Research grant <i>Modern light-emitting diodes and organic solar cells: new pathways towards a more sustainable production and use of energy (Nachleuchten)</i> , European Regional Development Fund, €1726709	2024
Consortium with Prof. Robert Kretschmer & Prof. Carsten Deibel (Chemnitz)	
Research grant <i>Femtosecond laser spectro-microscopy set-up</i> , German Research Foundation, €350000	2024
Emerging Investigator Award Journal of Materials Chemistry C	2023
Early Career Fellowship <i>Hybrid nanostructures for chiral optoelectronics – polarising communication</i> , Leverhulme Trust, United Kingdom; £118000	2022

¹German grading system: 1.0 is the best grade, below 4.0 counts as failed.

Matching funding for Leverhulme ECF Isaac Newton Trust, Cambridge, United Kingdom; £50000	2022
College Research Associate Sidney Sussex College, Cambridge	2021
Postdoctoral Fellowship <i>Spatio-temporal spectroscopy for characterising perovskite solar cells incorporating low-dimensional structures</i> , German Academic Exchange Service, short-term programme (6 months); €18704	2021
Postdoctoral Fellowship <i>Hot charge carriers in tin-based perovskite solar cells to exceed the Shockley-Queisser limit</i> , German Research Foundation; €66951	2019
Research Grant , <i>Hot-carrier extraction in tin-based perovskite solar cells to exceed the Shockley-Queisser limit</i> funded by the Dutch Research Council Grant design and participation in submission in the name of Prof. M. A. Loi Funding volume €325095	2018
Poster Award , Next Generation OPV II conference, Groningen, The Netherlands	2015
Doctoral Scholarship , Ubbo Emmius Foundation, University of Groningen, The Netherlands	2014-2015
Thesis Award for best bachelor's thesis 2011, Mentor e. V., Zwickau, Germany	2013

ACADEMIC VISITS & INTERNATIONAL EXPERIENCE

Visiting researcher in the group Prof. Sam Stranks University of Cambridge	since 2023
Visiting researcher in the group of Prof. Andrea Mura, University of Cagliari, Italy	2019
Visiting researcher in the group of Prof. Andrea Mura, University of Cagliari, Italy	2017
Undergraduate studies at the University of Linköping, Sweden	2012

TEACHING EXPERIENCE

COURSES

Lectures

<i>Semiconductor Physics & Nanostructures</i> , master level, Chemnitz	since 2024
<i>Halide Perovskites in Optoelectronics</i> , master level, Chemnitz	since 2023
<i>Oberseminar Advanced Functional Materials</i> , master level, Chemnitz	2024

Other

<i>Nanophysics</i> , assisting lecturer, bachelor level, Groningen	2019
<i>Nanophysics</i> , teaching assistant, bachelor level, Groningen	2017-2018

DOCTORAL PROJECTS

(Co-)Supervisor:

Arina Narudin, <i>Synthesis of novel perovskite compounds for optoelectronics</i> , Chemnitz	since 2023
Mengru Sun, <i>Spectroscopy and microscopy of novel semiconductors</i> , Chemnitz	since 2023
Shenyu Nie, <i>Nanomaterials for optical communication</i> , Cambridge	since 2023

Daily advisor:

Barnaby Lewis, <i>Transient absorption spectroscopy on perovskite solar cells</i> , Cambridge	since 2021
Alan Baldwin, <i>Statistical analysis of charge carrier recombination</i> , Cambridge	2021-2023
Eelco K Tekelenburg, <i>Photophysics of novel perovskite materials</i> , Groningen	2019-2021

STUDENT THESES

Daily advisor:

2 master's projects, 2 bachelor's projects, 3 internships/visits	2014-2023
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CONFERENCES & SEMINARS

ORGANISATION

Next Generation Solar Energy PhD/Postdoc Series since 2022

Co-organiser of a bi-weekly seminar series for emerging researchers in the field of materials science and renewable energy

<https://www.ngse.info/phd-postdoc-series>

2D Perovskites: Synthesis, Properties, and Applications 2023

Symposium co-organisation at the MATSUS23 Spring Meeting, Valencia, Spain

Two-Dimensional Perovskites - Fundamentals, Applications, and Perspectives 2021

Symposium co-organisation at the NanoGe Spring Meeting, online

CONTRIBUTIONS (last five years)

Broad emission bands in halide perovskite-inspired materials – current understanding and open questions 2024

Perovskite Workshop – Multi-Timescale Dynamic Processes in Metal Halide Perovskites: From Fundamentals to Applications, Lund, Sweden (**invited**)

Unravelling the Photophysics of Halide Perovskites with PL Spectro-Microscopy 2024

International Conference on Science and Technology of Synthetic Electronic Materials, Dresden, Germany (**invited**)

Photophysics of Halide Perovskites – Making Sense of Some Puzzling Observations 2024

Semiconductor Physics Group, University of Leipzig, Germany (**invited**)

The power of optical spectro-microscopy in the realm of energy materials 2024

Sino-German Workshop on Printable Photovoltaics, Erlangen, Germany (**invited**)

Luminescence in 2D perovskites – on trapping and self-trapping 2023

European Materials Research Society, Warsaw, Poland (**invited**)

Luminescence in 2D perovskites – on trapping and self-trapping 2023

ACS Fall2023, San Francisco, USA (**invited**)

Luminescence in 2D perovskites – on trapping and self-trapping 2022

Emerging Light Emitting Materials 22, Limassol, Cyprus (oral)

Beware of the local effects – 2D perovskites under the microscope 2022

NanoGe Strain and 2D Perovskites (S2DP) seminar, online (**invited**)

Luminescence in 2D perovskites – on trapping and self-trapping 2022

Centre for Processable Electronics Annual Symposium *Imperial College, London, United Kingdom*, (**invited**)

Taking a closer look: the power of optical microscopy to unravel the complex world of two-dimensional perovskites 2022

Seminar talk in *Next Generation Solar Energy, PhD-postdoc series*, online (**invited**)

Hot, Bright, and Trapped States: Luminescence of Two-Dimensional Perovskites and Lessons Learnt from Photoluminescence Microscopy 2021

Seminar talk in *Optoelectronics of Halide Perovskites series*, University of Bayreuth, Germany (**invited**)

Broad Emission Bands in Two-Dimensional Perovskites and the Role of Exciton Self-Trapping 2021

NanoGe Fall Meeting, online (oral)

Hot, bound, and defect states – exploring the rich photophysics of two-dimensional perovskites 2020

Seminar Talk Photonics and Optoelectronics Lab, University of Cagliari, Italy (**invited**)

Photoluminescence spectroscopy of perovskites – beyond 3D lead variants	2020
Seminar Talk for PVsquared group, University of Pavia, Italy (invited)	
On the origin of broad luminescence bands in low-dimensional perovskites	
NanoGe International Conference on Perovskite Solar Cells, Photonics and Optoelectronics (NIPHO20), Seville, Spain (oral)	
The remarkable physics of tin halide perovskites: on hot states and dark states	2019
13 th International Conference on Optical Probes for Organic and Hybrid Optoelectronic Materials and Applications, Vilnius, Lithuania (oral)	
The remarkable physics of tin halide perovskites: on hot states and dark states	2019
10 th International Conference on Materials for Advanced Technologies, Singapore, Singapore (oral)	
The remarkable physics of tin halide perovskites: on hot states and dark states	2019
Next Generation Photovoltaic Materials IV, Groningen, The Netherlands (oral)	
The photophysics of FASnI₃ thin films – how processing affects hot carriers, scattering mechanisms and long-lived states	2019
3 rd Generation Photovoltaic Technologies and Beyond, King Abdullah University, Saudi Arabia, (poster)	

PROFESSIONAL SERVICES & OUTREACH

Outreach presentation <i>Printed solar cells and the future of photovoltaics</i> as part of 'Schülerlabor', a week-long introduction to research at the Institute of Physics, Chemnitz, Germany	2024
Outreach presentation <i>Organische Solarzellen</i> as part of 'Lüscher Lectures 2023' for Physics teachers at secondary schools, Dillingen, Germany	2023
Outreach presentation <i>Lead sulphide colloidal quantum dots</i> for "Francken" student association, Groningen, The Netherlands	2018
Outreach presentation <i>Electrical power from the sun</i> as a part of university lecture series <i>Studium Generale</i> , Zwickau, Germany	2011
Member of programme commission & exam commission Advanced Functional Materials (MSc), Chemnitz University of Technology	since 2024
Liaison lecturer Friedrich-Ebert Foundation, Bonn, Germany	since 2024
Student mentor Friedrich-Ebert Foundation, Bonn, Germany	since 2021
Laser safety officer Department of Chemical Engineering and Biotechnology, University of Cambridge	2022-2023
Grant reviewer National Science Centre Poland	since 2021
Reviewer for Feodor-Lynen scholarships Alexander von Humboldt Foundation	since 2021
Member of German Physical Society (DPG)	since 2022
Peer-reviewer including for <i>ACS Nano</i> , <i>Adv. Funct. Mater.</i> , <i>Adv. Mater.</i> , <i>Joule</i> , <i>J. Am. Chem. Soc.</i> , <i>J. Phys. Chem. Lett.</i> , <i>Sci. Adv.</i> , <i>Appl. Phys. Lett.</i>	

PUBLICATIONS

Currently, 47 published reports in international peer-reviewed journals, 17 of which as first author, accumulate a total of 2067 citations with a Hirsch index of 26 and an i10 index of 35 (Google scholar). * Denotes corresponding authorship.

1. X. Luo, W. Xu, G. Zheng, S. Tammireddy, Q. Wei, M. Karlsson, Z. Zhang, K. Ji, S. Kahmann, C. Yin, Y. Zou, Z. Zhang, H. Chen, L. Marcal, H. Zhao, D. Ma, D. Zhang, Y. Lu, M. Li, C. Deibel, S. D. Stranks, L. Duan, J. Wallentin, W. Huang, F. Gao, Effects of local compositional heterogeneity in mixed halide perovskites on blue electroluminescence, *Matter* 7, 1054 (2024)
2. K. W. P. Orr, J. Diao, M. N. Lintangpradipto, D. J. Batey, A. N. Iqbal, S. Kahmann, K. Frohna, M. Dubajic, S. J. Zelewski, A. E. Dearle, T. A. Selby, P. Li, T. A. S. Doherty, S. Hofmann, O. M.

- Bakr, I. K. Robinson, S. D. Stranks, Imaging light-induced migration of dislocations in halide perovskites with 3d nanoscale strain mapping, *Adv. Mater.* 35, 2305549 (2023)
3. Y. Zou, X. Bai, S. Kahmann, L. Dai, S. Yuan, S. Yin, J. E. Heger, M. Schwartzkopf, S. V. Roth, C.-C. Chen, J. Zhang, S. D. Stranks, R. D. Friend, P. Müller-Buschbaum, A practical approach towards highly reproducible and high-quality perovskite films based on an aging treatment, *Adv. Mater.* 36, 2307024 (2024)
 4. M. Rivera Medina, L. Di Mario, S. Kahmann, J. Xi, G. Portale, G. Bongiovanni, A. Mura, J. C. Alonso-Huíttron, M. A. Loi, Tuning the energy transfer in ruddlesden-popper perovskites phases through isopropylammonium addition - towards efficient blue emitters, *Nanoscale* 15, 6673 (2023)
 5. H.-H. Fang, E. K. Tekelenburg, H. Xue, S. Kahmann, L. Chen, S. Adjokatse, G. Brocks, S. Tao, M. A. Loi, Unraveling the broadband emission in mixed tin-lead layered perovskites, *Adv. Opt. Mater.* 11, 2202038 (2023)
 6. *S. Kahmann, H. Duim, A. Rommens, G. H. Ten Brink, G. Portale, S. D. Stranks, M. A. Loi, Taking a closer look – how the microstructure of dion-jacobson perovskites governs their photophysics, *J. Mater. Chem. C* 10, 17539 (2022)
 7. *S. Kahmann, D. Meggiolaro, L. Gregori, E. K. Tekelenburg, M. Pitaro, S. D. Stranks, F. De Angelis, M. A. Loi, The origin of broad emission in <100> two-dimensional perovskites: Extrinsic vs. intrinsic processes, *ACS Energy Letters* 7, 4232 (2022)
 8. O. D. I. Moseley, B. Roose, S. J. Zelewski, S. Kahmann, K. Dey, S. D. Stranks, Tunable multiband halide perovskite tandem photodetectors with switchable response, *ACS Photonics* 9, 3958 (2022)
 9. C. Cho, S. Feldmann, K. M. Yeom, Y.-W. Jang, S. Kahmann, J.-Y. Huang, T. C.-J. Yang, M. N. T. Khayat, Y.-R. Wu, M. Choi, J. H. Noh, S. D. Stranks, N. C. Greenham, Efficient vertical charge transport in polycrystalline halide perovskites revealed by four-dimensional tracking of charge carriers, *Nature Materials* 21, 1388 (2022)
 10. S. Kahmann, Z. Chen, O. Hordichuk, O. Nazarenko, S. Shao, M. V. Kovalenko, G. R. Blake, S. Tao, M. A. Loi, Compositional Variation in $\text{FAPb}_{1-x}\text{Sn}_x\text{I}_3$ and Its Impact on the Electronic Structure: A Combined Density Functional Theory and Experimental Study, *ACS Appl. Mater. Interfaces* 4, 34253 (2022)
 11. D. Bederak, A. Shulga, S. Kahmann, W. Talsma, J. Pelanskis, D. N. Dirin, M. V. Kovalenko, M. A. Loi, Heterostructure from PbS Quantum Dot and Carbon Nanotube Inks for High-Efficiency Near-Infrared Light-Emitting Field-Effect Transistors, *Advanced Electronic Materials* 8, 2101126 (2022)
 12. J. Warby, F. Zu, S. Zeiske, E. Gutierrez-Partida, L. Frohloff, S. Kahmann, K. Frohna, E. Mosconi, E. Radicchi, F. Lang, S. Shah, F. Peña-Camargo, H. Hempel, T. Unold, N. Koch, A. Armin, F. De Angelis, S. D. Stranks, D. Neher, M. Stolterfoht, Understanding Performance Limiting Interfacial Recombination in *pin* Perovskite Solar Cells, *Advanced Energy Materials* 12, 2103567 (2022)
 13. *S. Kahmann, H. Duim, A. J. Rommens, E. K. Tekelenburg, S. Shao, M. A. Loi, Grain-Specific Transitions Determine the Band Edge Luminescence in Dion–Jacobson Type 2D Perovskites, *Advanced Optical Materials* 9, 2100892 (2021)
 14. S. Kahmann, H. Duim, H.-H. Fang, M. Dyksik, S. Adjokatse, M. Rivera Medina, M. Pitaro, P. Plochocka, M. A. Loi, Photophysics of Two-Dimensional Perovskites—Learning from Metal Halide Substitution, *Advanced Functional Materials* 31, 2103778 (2021)
 15. J. Liu, B. Van der Zee, D. R. Villava, G. Ye, S. Kahmann, M. Kamperman, J. Dong, L. Qiu, G. Portale, M. A. Loi, J. C. Hummelen, R. C. Chiechi, D. Baran, L. J. A. Koster, Molecular Doping Directed by a Neutral Radical, *ACS Appl. Mater. Interfaces* 13, 29858 (2021)
 16. A. Filippetti, S. Kahmann, C. Caddeo, A. Mattoni, M. Saba, A. Bosin, M. A. Loi, Fundamentals of tin iodide perovskites: a promising route to highly efficient, lead-free solar cells, *J. Mater. Chem. A* 9, 11812 (2021)
 17. S. Shao, W. Talsma, M. Pitaro, J. Dong, S. Kahmann, A. J. Rommens, G. Portale, M. A. Loi, Field-Effect Transistors Based on Formamidinium Tin Triiodide Perovskite, *Advanced Functional Materials* 31, 2008478 (2021)

18. E. K. Tekelenburg, S. Kahmann, M. E. Kamminga, G. R. Blake, M. A. Loi, Elucidating the Structure and Photophysics of Layered Perovskites through Cation Fluorination, *Advanced Optical Materials* 9, 2001647 (2021)
19. S. Shao, M. Nijenhuis, J. Dong, S. Kahmann, G. H. ten Brink, G. Portale, M. A. Loi, Influence of the stoichiometry of tin-based 2D/3D perovskite active layers on solar cell performance, *J. Mater. Chem. A* 9, 10095 (2021)
20. D. Bederak, N. Sukharevska, S. Kahmann, M. Abdu-Aguye, H. Duim, D. N. Dirin, M. V. Kovalenko, G. Portale, M. A. Loi, On the Colloidal Stability of PbS Quantum Dots Capped with Methylammonium Lead Iodide Ligands, *ACS Appl. Mater. Interfaces* 12, 52959 (2020)
21. S. Kahmann, M. A. Loi, Trap states in lead chalcogenide colloidal quantum dots—origin, impact, and remedies, *Applied Physics Reviews* 7, 041305 (2020)
22. B. G. H. M. Groeneveld, H. Duim, S. Kahmann, O. De Luca, E. K. Tekelenburg, M. E. Kamminga, L. Protesescu, G. Portale, G. R. Blake, P. Rudolf, M. A. Loi, Photochromism in Ruddlesden–Popper copper-based perovskites: a light-induced change of coordination number at the surface, *J. Mater. Chem. C* 8, 15377 (2020)
23. S. Kahmann, O. Nazarenko, S. Shao, O. Hordiichuk, M. Kepenekian, J. Even, M. V. Kovalenko, G. R. Blake, M. A. Loi, Negative Thermal Quenching in FASnI₃ Perovskite Single Crystals and Thin Films, *ACS Energy Lett.* 5, 2512 (2020)
24. S. Kahmann, E. K. Tekelenburg, H. Duim, M. E. Kamminga, M. A. Loi, Extrinsic nature of the broad photoluminescence in lead iodide-based Ruddlesden–Popper perovskites, *Nat Commun* 11, 2344 (2020)
25. J. Dong, S. Shao, S. Kahmann, A. J. Rommens, D. Hermida-Merino, G. H. ten Brink, M. A. Loi, G. Portale, Mechanism of Crystal Formation in Ruddlesden–Popper Sn-Based Perovskites, *Advanced Functional Materials* 30, 2001294 (2020)
26. I. van de Riet, H.-H. Fang, S. Adjokatse, S. Kahmann, M. A. Loi, Influence of morphology on photoluminescence properties of methylammonium lead tribromide films, *Journal of Luminescence* 220, 117033 (2020)
27. M. Abdu-Aguye, D. Bederak, S. Kahmann, N. Killilea, M. Sytnyk, W. Heiss, M. A. Loi, Photophysical and electronic properties of bismuth-perovskite shelled lead sulfide quantum dots, *J. Chem. Phys.* 151, 214702 (2019)
28. G. Demirel, R. L. M. Giesecking, R. Ozdemir, S. Kahmann, M. A. Loi, G. C. Schatz, A. Facchetti, H. Usta, Molecular engineering of organic semiconductors enables noble metal-comparable SERS enhancement and sensitivity, *Nat Commun* 10, 5502 (2019)
29. H. Duim, S. Adjokatse, S. Kahmann, G. H. ten Brink, M. A. Loi, The Impact of Stoichiometry on the Photophysical Properties of Ruddlesden–Popper Perovskites, *Adv. Funct. Mater.* 30, 1907505 (2020)
30. R. Sun, J. Guo, Q. Wu, Z. Zhang, W. Yang, J. Guo, M. Shi, Y. Zhang, S. Kahmann, L. Ye, X. Jiao, M. A. Loi, Q. Shen, H. Ade, W. Tang, C. J. Brabec, J. Min, A multi-objective optimization-based layer-by-layer blade-coating approach for organic solar cells: rational control of vertical stratification for high performance, *Energy Environ. Sci.* 12, 3118 (2019)
31. S. Kahmann, A. Shulga, M. A. Loi, Quantum Dot Light-Emitting Transistors—Powerful Research Tools and Their Future Applications, *Advanced Functional Materials* 30, 1904174 (2020)
32. S. Kahmann, S. Shao, M. A. Loi, Cooling, Scattering, and Recombination—The Role of the Material Quality for the Physics of Tin Halide Perovskites, *Adv. Funct. Mater.* 29, 1902963 (2019)
33. S. Adjokatse, S. Kahmann, H. Duim, M. A. Loi, Effects of strontium doping on the morphological, structural, and photophysical properties of FASnI₃ perovskite thin films, *APL Materials* 7, 031116 (2019)
34. N. Gasparini, S. Kahmann, M. Salvador, J. D. Perea, A. Sperlich, A. Baumann, N. Li, S. Reiberger, E. Spiecker, V. Dyakonov, G. Portale, M. A. Loi, C. J. Brabec, T. Ameri, Favorable Mixing Thermodynamics in Ternary Polymer Blends for Realizing High Efficiency Plastic Solar Cells, *Adv. Energy Mater.* 9, 1803394 (2019)

35. S. Kahmann, M. A. Loi, Hot carrier solar cells and the potential of perovskites for breaking the Shockley–Queisser limit, *J. Mater. Chem. C* 7, 2471 (2019)
36. A. Classen, L. Einsiedler, T. Heumueller, A. Graf, M. Brohmann, F. Berger, S. Kahmann, M. Richter, G. J. Matt, K. Forberich, J. Zaumseil, C. J. Brabec, Absence of Charge Transfer State Enables Very Low V_{OC} Losses in SWCNT:Fullerene Solar Cells, *Adv. Energy Mater.* 9, 1801913 (2019)
37. A. G. Shulga, S. Kahmann, D. N. Dirin, A. Graf, J. Zaumseil, M. V. Kovalenko, M. A. Loi, Electroluminescence Generation in PbS Quantum Dot Light-Emitting Field-Effect Transistors with Solid-State Gating, *ACS Nano* 12, 12805 (2018)
38. S. Kahmann, W. Gomulya, M. A. Loi, A. Mura, Donor–acceptor photoexcitation dynamics in organic blends investigated with a high sensitivity pump–probe system, *J. Mater. Chem. C* 6, 10822 (2018)
39. S. Kahmann, M. A. Loi, C. J. Brabec, Delocalisation softens polaron electronic transitions and vibrational modes in conjugated polymers, *J. Mater. Chem. C* 6, 6008 (2018)
40. S. Kahmann, M. Sytnyk, N. Schrenker, G. J. Matt, E. Spiecker, W. Heiss, C. J. Brabec, M. A. Loi, Revealing Trap States in Lead Sulphide Colloidal Quantum Dots by Photoinduced Absorption Spectroscopy, *Adv. Electron. Mater.* 4, 1700348 (2018)
41. S. Kahmann, J. M. Salazar Rios, M. Zink, S. Allard, U. Scherf, M. C. dos Santos, C. J. Brabec, M. A. Loi, Excited-State Interaction of Semiconducting Single-Walled Carbon Nanotubes with Their Wrapping Polymers, *J. Phys. Chem. Lett.* 8, 5666 (2017)
42. S. Kahmann, D. Fazzi, G. J. Matt, W. Thiel, M. A. Loi, C. J. Brabec, Polarons in Narrow Band Gap Polymers Probed over the Entire Infrared Range: A Joint Experimental and Theoretical Investigation, *J. Phys. Chem. Lett.* 7, 4438 (2016)
43. S. Chen, Y. Hou, H. Chen, M. Richter, F. Guo, S. Kahmann, X. Tang, T. Stubhan, H. Zhang, N. Li, N. Gasparini, C. O. R. Quiroz, L. S. Khazada, G. J. Matt, A. Osvet, C. J. Brabec, Exploring the Limiting Open-Circuit Voltage and the Voltage Loss Mechanism in Planar CH₃NH₃PbBr₃ Perovskite Solar Cells, *Advanced Energy Materials* 6, 1600132 (2016)
44. X. Tang, M. Brandl, B. May, I. Levchuk, Y. Hou, M. Richter, H. Chen, S. Chen, S. Kahmann, A. Osvet, F. Maier, H.-P. Steinrück, R. Hock, G. J. Matt, C. J. Brabec, Photoinduced degradation of methylammonium lead triiodide perovskite semiconductors, *J. Mater. Chem. A* 4, 15896 (2016)
45. H. Chen, Y. Hou, C. E. Halbig, S. Chen, H. Zhang, N. Li, F. Guo, X. Tang, N. Gasparini, I. Levchuk, S. Kahmann, C. O. Ramirez Quiroz, A. Osvet, S. Eigler, C. J. Brabec, Extending the environmental lifetime of unpackaged perovskite solar cells through interfacial design, *J. Mater. Chem. A* 4, 11604 (2016)
46. S. Kahmann, A. Mura, L. Protesescu, M. V. Kovalenko, C. J. Brabec, M. A. Loi, Opto-electronics of PbS quantum dot and narrow bandgap polymer blends, *J. Mater. Chem. C* 3, 5499 (2015)
47. B. Beyer, D. Griese, C. Schirrmann, R. Pfeifer, S. Kahmann, O. R. Hild, K. Leo, Small molecule bulk heterojunction organic solar cells with coumarin-6 as donor material, *Thin Solid Films* 536, 206 (2013)