

Publication List Prof. Dr. Matthias Wuttig

[447] M. Giteau, L. Conrads, A. Mathwieser, R. Schmitt, M. Wuttig, T. Taubner, and G. T. Papadakis

Switchable Narrowband Diffuse Thermal Emission with an In_3SbTe_2 -Based Planar Structure
Laser Photonics Rev. 2401438, (2024)

[446] M. Liu, M. Guo, Y. Yang, X. Dong, H. Lyu, Y. Zhang, Y. Lai, Y. Zhu, H. Wu, F. Guo, Z. Liu, W. Cai, M. Wuttig, H. Wu, Y. Yu, and J. Sui

High Thermoelectric Performance in GeTe Realized by Synergistic Band Convergence, Lattice Plainification, Nanoprecipitates and Point Defects
Advanced Energy Materials, under review

[445] R. Chu, X. Shen, J. Wang, S. Sun, M. Wuttig, R. Mazzarello, W. Zhang

Ab initio investigation of amorphous and crystalline arsenic sesqui-chalcogenides: optical properties explained by metavalent bonding
PSS-RRL, accepted

[444] F. Hoff, P. Kerres, T. Veslin, A. R. Jalil, T. Schmidt, L. Bothe, J. Frank, C.-F. Schön, Y. Xu, S. Ritarossi, D. Kim, J. Mertens, R. Mazzarello, M. Wuttig

Confinement Dependent Peierls Distortion in Epitaxially Grown Bismuth Films
Advanced Materials, resubmitted

[443] A. Kiehn, S. Gruner, C. Stenz, C.-F. Schön, J. Köttgen, S. Ritarossi, C. Ringkamp, P. Cao, A. Vymazalová, J. Mayer, A. G. Christy, M. Wuttig

Classification of Layered Chalcogenides: Explaining their Mineral Diversity in the Earth's Crust
Nature Communications, submitted

[442] M. Wuttig, R. Waser, R. Dittmann

Nanoswitches: Resistively Switching Chalcogenides for Future Electronics
Phys. Status Solidi A (2024)

[441] Y. Yu, M. Liu, M. Guo, H. Lyu, Y. Lai, Y.-K. Zhu, F. Guo, Y. Yang, K. Yu, X. Dong, Z. Liu, W. Cai, M. Wuttig, J. Sui

Doping Strategy in Metavalently Bonded Materials for Advancing Thermoelectric Performance
Nature Communications (2024)

[440] O. Cojocaru-Mirédin, Y. Yu, J. Köttgen, T. Ghosh, C.-F. Schön, S. Han, C. Zhou, M. Zhu, M. Wuttig

Atom probe tomography: a local probe for chemical bonds in solids
Advanced Materials 2403046 (2024)

[439] Y. Li, T. Colnaghi, Y. Gong, H. Zhang, Y. Yu, Y. Wei, B. Gan, M. Song, A. Marek, M. Rampp, S. Zhang, Z. Pei, M. Wuttig, S. Ghosh, F. Körmann, J. Neugebauer, Z. Wang, B. Gault

Machine learning-enabled tomographic imaging of chemical short-range atomic ordering
Advanced Materials 2407564 (2024)

[438] C. Lee, D. Kim, H. Lim, Y. Seong, H. Kim, J. H. Park, D. Yang, H. Shin, M. Wuttig, B. J. Choi, M.-H. Cho

Ultrahigh stability and operation performance in Bi-doped GeTe/Sb₂Te₃ superlattices achieved by tailoring bonding and structural properties
ACS Nano, accepted

- [437] M.J. Müller, C. Morell, P. Kerres, M. Raghuwanshi, R. Pfeiffer, S. Meyer, C. Stenz, J. Wang, D.N. Chigrin, P. Lucas, M. Wuttig
Decoupling Nucleation and Growth in fast Crystallization of Phase Change Materials
Advanced Functional Materials 2403476 (2024)
- [436] J.-Y. Raty, C. Bichara, C.-F. Schön, C. Gatti, M. Wuttig
Changes of Bonding upon Crystallization in Phase Change Materials
PNAS, 121 (19) e2405294121 (2024)
- [435] N. Lin, S. Han, T. Ghosh, C.-F. Schön, D. Kim, J. Frank, F. Hoff, T. Schmidt, P. Ying, Y. Zhu, M. Häser, M. Shen, M. Liu, J. Sui, O. Cojocar-Mirédin, C. Zhou, R. He, M. Wuttig, and Y. Yu
Metavalent Bonding in Cubic SnSe Alloys Improves Thermoelectric Properties over a Broad Temperature Range
Advanced Functional Materials 2315652 (2024)
- [434] P. Kerres, R. Mazzarello, O. Cojocar-Mirédin and M. Wuttig
Growth of textured chalcogenide thin films and their functionalization through confinement
Physica Status Solidi A 2300921 (2024)
- [433] L. Conrads, L. Schüller, K.G. Wirth, M. Wuttig, T. Taubner
Direct programming of confined Surface Phonon Polariton Resonators using the plasmonic Phase-Change Material In_3SbTe_2
Nature Communications 15, 3472 (2024)
- [432] G. Tang, Y. Liu, X. Yang, Y. Zhang, P. Nan, P. Ying, Y. Gong, X. Zhang, B. Ge, N. Lin, X. Miao, K. Song, C.-F. Schön, M. Cagnoni, D. Kim, Y. Yu, M. Wuttig
Interplay between metavalent bonds and dopant orbitals enables the design of SnTe thermoelectrics
Nature Communications (2024) 15:9133
- [431] J. Pries, C. Stenz, S. Wei, M. Wuttig, P. Lucas
Structural Relaxation of Amorphous Phase Change Materials at Room Temperature
Journal of Applied Physics 135, 135101 (2024)
- [430] Y. Li, T. Colnaghi, Y. Gong, H. Zhang, Y. Yu, Y. Wei, B. Gan, M. Song, A. Marek, M. Rampp, S. Zhang, Z. Pei, M. Wuttig, S. Ghosh, F. Körmann, J. Neugebauer, Z. Wang, B. Gault
Machine Learning-Enabled Tomographic Imaging of Chemical Short-Range Atomic Ordering
Advanced Materials 2407564 (2024)
- [429] H. Zhang, M. Shen, C. Stenz, C. Teichrib, R. Wu, L. Schäfer, N. Lin, Y. Zhou, C. Zhou, O. Cojocar-Mirédin, M. Wuttig, Y. Yu
Improved charge carrier transport across grain boundaries in n-type PbSe by dopant segregation
Small Science, 2300299 (2024)
- [428] D. An, S. Zhang, X. Zhai, W. Yang, R. Wu, H. Zhang, W. Fan, W. Wang, S. Chen, O. Cojocar-Mirédin, X.-M. Zhang, M. Wuttig, and Y. Yu
Metavalently bonded tellurides: the essence of improved thermoelectric performance in elemental Te
Nature Communications 15: 3177 (2024)

- [427] Y. Yu, A. Sheskin, Z. Wang, A. Uzhansky, Y. Natanzon, L. Abdellaoui, T. Schwarz, C. Scheu, M. Wuttig, O. Cojocaru-Mirédin, Y. Amouyal, S. Zhang
The impact of Ostwald ripening of Ag₂Te on the thermoelectric properties of PbTe-based alloy
Advanced Energy Materials, **2304442** (2024)
- [426] L. Conrads, A. Hessler, L. Völkel, K. Wilden, A. Strauch, J. Pries, M. Wuttig, T. Taubner
Infrared Resonance Tuning of Nanoslit Antennas with Phase-Change Materials
ACS Nano **3c11121** (2023)
- [425] J.-Y. Raty, C. Bichara, C.-F. Schön, C. Gatti, M. Wuttig
Tailoring chemical bonds to design unconventional glasses
PNAS, **121** (2) **e2316498121** (2024)
- [424] M. Wuttig, C.-F. Schön, D. Kim, P. Golub, C. Gatti, J.-Y. Raty, B.J. Kooi, A. M. Pendás, R. Arora, U. Waghmare
Metavalent or Hypervalent Bonding: Is there a chance for reconciliation?
Advanced Science **11**, **2308578** (2024)
- [423] J. Yang, X. Zhang, H. Ye, X. Yang, L. Wang, X. Miao, H. Hou, Z. Shi, J. Liu, S. Chen, G. Qiao, C. Zhou, M. Wuttig, G. Liu, Y. Yu
Dual-site doping and low-angle grain boundaries lead to high thermoelectric performance in n-type Bi₂S₃
Advanced Functional Materials, **2306961** (2023)
- [422] Y. Zhu, Y. Yu, H. Zhang, Y. Qin, Z. Wang, S. Zhan, N. Lin, Y. Tao, D. Liu, T. Hong, S. Wang, Z.-H. Ge, M. Wuttig, L.-D. Zhao
Large Mobility enables High thermoelectric cooling and power generation performance in n-type AgPb_{18+x}SbTe₂₀ (LAST) single crystal
JACS, **145**, **24931-24939** (2023)
- [421] W. Yao, Y. Zhang, T. Lyu, W. Huang, N. Huang, X. Li, C. Zhang, F. Liu, M. Wuttig, Y. Yu, M. Hong, L. Hu
Two-step phase manipulation by tailoring chemical bonds leading to high-performance GeSe thermoelectrics
The Innovation **4**, **100522** (2023)
- [420] P. Prabhathan, K.V. Sreekanth, J. Teng, J.H. Ko, Y.J. Yoo, H.-H. Jeong, Y. Lee, S. Zhang, T. Cao, C.-C. Popescu, B. Mills, T. Gu, Z. Fang, R. Chen, H. Tong, Y. Wang, Q. He, Y. Lu, Z. Liu, H. Yu, A. Mandal, Y. Cui, A. S. Ansari, V. Bhingardive, M. Kang, C. K. Lai, M. Merklein, M. J. Müller, Y. M. Song, Z. Tian, J. Hu, M. Losurdo, A. Majumdar, X. Miao, X. Chen, B. Gholipour, K. A. Richardson, B. J. Eggleton, K. Sharda, M. Wuttig, R. Singh
Roadmap for Phase Change Materials in Photonics and Beyond
iSCIENCE **26**, **107946** (2023)
- [419] J. Mertens, P. Kerres, Y. Xu, M. Raghuwanshi, D. Kim, C.-F. Schön, J. Frank, F. Hoff, Y. Zhou, R. Mazzarello, A. R. Jalil, M. Wuttig
Confinement Induced Phonon Softening and Hardening in Sb₂Te₃ Thin Films
Advanced Functional Materials **2307681** (2023)
- [418] C. Stenz, J. Pries, T. W. Surta, M.W. Gaultois, M. Wuttig
Evolution of short-range order of amorphous GeTe upon structural relaxation obtained by TEM diffractometry and RMC methods
Advanced Science **2304323** (2023)
- [417] Y. Yu, O. Cojocaru-Mirédin, M. Wuttig

Atom Probe Tomography Advances Chalcogenide Phase-Change and Thermoelectric Materials

Physica Status Solidi A 2300425 (2023)

[416] A. Kulkarni, R. Sarkar, S. Akel, M. Häser, B. Klingebiel, M. Wuttig, S. Wiegand, S. Chakraborty, M. Saliba, T. Kirchartz

A Universal Strategy of Perovskite Ink-Substrate Interaction to Overcome the Poor Wettability of a Self-Assembled Monolayer for Reproducible Perovskite Solar Cells

Advanced Functional Materials 23005812 (2023)

[415] C. Zhang, Q. Lai, W. Wang, X. Zhou, K. Lan, L. Hu, B. Cai, M. Wuttig, J. He, F. Liu, Y. Yu

Gibbs Adsorption and Zener Pinning Enable Mechanically Robust High-Performance Bi₂Te₃-based Thermoelectric Devices

Advanced Science 10, 2302688 (2023)

[414] B. Ge, C. Li, W. Lu, W. He, Z. Wei, Z. Shi, D. Kim, C. Zhou, M. Zhu, M. Wuttig, Y. Yu
Dynamic Phase Transition leading to Extraordinary Plastic Deformability of Thermoelectric SnSe₂ Single Crystal

Advanced Energy Materials 13, 2300965 (2023)

[413] L. Conrads, A. Hessler, K. Wirth, S. Meyer, M. Wuttig, D. Chigrin, T. Taubner
Infrared resonance tailoring of individual split-ring resonators with phase-change materials by locally changing the dielectric surrounding of the antenna hotspots

Advanced Optical Materials 2300499 (2023)

[412] Y. Yu, C. Zhou, T. Ghosh, C.-F. Schön, Y. Zhou, S. Wahl, M. Raghuwanshi, P. Kerres, C. Bellin, A. Shukla, O. Cojocaru-Mirédin, M. Wuttig
Doping by Design: Enhanced Thermoelectric Performance of GeSe Alloys Through Metavalent Bonding

Advanced Materials 2300893 (2023)

[411] W. Zhang, H. Zhang, S. Sun, X. Wang, Z. Lu, X. Wang, J.-J. Wang, C. Jia, C.-F. Schön, R. Mazzarello, E. Ma, M. Wuttig

Metavalent bonding in layered phase-change memory materials

Advanced Science 10, 202300901 (2023)

[410] Y. Yu and M. Wuttig

Metavalent bonding impacts charge carrier transport across grain boundaries

Nano Research Energy 2, e9120057 (2023)

[409] R. Wu, Y. Yu, S. Jia, C. Zhou, O. Cojocaru-Miredin, M. Wuttig

Strong Charge Carrier Scattering at Grain Boundaries caused by the Collapse of Metavalent Bonding in PbTe

Nature Communications 14, 719 (2023)

[408] P. Lucas, W. Takeda, J. Pries, J. Benke-Jacob, M. Wuttig

Fast crystallization below the glass transition temperature in hyperquenched systems

Journal of Chemical Physics 158, 054502 (2023)

[407] L. Hu, B. Duan, T. Lyu, C. Zhang, F. Liu, J. Li, M. Wuttig, Y. Yu

In situ design of high-performance dual-phase GeSe thermoelectrics by tailoring chemical bonds

Advanced Functional Materials 2214854 (2023)

[406] L. Conrads, N. Honné, A. Ulm, A. Hessler, R. Schmitt, M. Wuttig, T. Taubner

Reconfigurable and polarization dependent perfect absorber for large-area emissivity control based on the plasmonic phase-change material In_3SbTe_2

Advanced Optical Materials 2202696 (2023)

[405] M. Wuttig, C.-F. Schön, J. Löttering, P. Golub, C. Gatti, J.-Y. Raty
Revisiting the nature of chemical bonding in chalcogenides to explain and design their properties

Advanced Materials 2208485 (2023)

[404] C. Zhang, G. Yan, Y. Wang, X. Wu, L. Hu, F. Liu, W. Ao, O. Cojocaru-Mirédin, M. Wuttig, G. J. Snyder and Y. Yu,
Grain boundary complexions decouple the electron and phonon transport leading to high-performance GeTe thermoelectric device

Advanced Energy Materials 13, 2203361 (2023)

[403] B. Gholipour, S.R. Elliott, M.J. Müller, M. Wuttig, D.W. Hewak, B.E. Hayden, Y. Li, S.S. Jo, R. Jaramillo, R.E. Simpson, J. Tominaga, Y. Cui, A. Mandal, B.J. Eggleton, M. Rochette, M. Rezaei, I. Alamgir, H.M. Shamim, R. Kormokar, A. Anjum, G. Zeweldi, T.S. Karnik, J. Hu, S.O. Kasap, G. Belev, A. Reznik

Roadmap on Chalcogenide Photonics

J. Phys. Photonics 5, 012501 (2023)

[402] Y. Wu, P. Qiu, Y. Yu, Y. Xiong, T. Deng, O. Cojocaru, M. Wuttig, X. Shi, L. Chen
High-performance and stable AgSbTe_2 -based thermoelectric materials for near room temperature applications

Journal of Materiomics 8, 1095 (2022)

[401] Y. Cheng, Q. Yang, J. Wang, T. Dimitriadis, M. Schumacher, H. Zhang, M. J. Müller, N. Amini, F. Yang, A. Schoekel, J. Pries, R. Mazzarello, M. Wuttig, H.-B. Yu, S. Wei

Highly-tunable β -relaxation enables the tailoring of crystallization in phase-change materials

Nature Communications 13, 7352 (2022)

[400] C.-F. Schön, S. van Bergerem, C. Mattes, A. Yadav, M. Grohe, L. Kobbelt, M. Wuttig
Classification of properties and their relation to chemical bonding: Essential steps towards the inverse design of materials with tailored functionalities

Science Advances 8, eade0828 (2022)

[399] J.-J. Wang, S. Sun, L. Lu, H. Du, C.-L. Jia, O. Cojocaru-Mirédin, J. Yang, G. Liu, C. Zhou, G. Qiao, Z. Shi, E. Ma, B. Ge, Y. Yu, M. Wuttig, W. Zhang,
Enhancing the thermoelectric performance of $\beta\text{-Zn}_4\text{Sb}_3$ via progressive incorporation of Zn interstitials

Nano Energy 104, 107967 (2022)

[398] J. Perrin Toinin, C. Hatzoglou, J. Voronkoff, H. Montigaud, D. Guimard, M. Wuttig, F. Vurpillot, O. Cojocaru-Mirédin

A Quantitative Investigation of Functionalized Glazing Stacks by Atom Probe Tomography

Adv. Mater. Technol. 2200922, (2022)

[397] T.-T. Jiang, X.-D. Wang, J.-J. Wang, H.-Y. Zhang, L. Lu, C. Jia, M. Wuttig, R. Mazzarello, W. Zhang, E. Ma

In situ characterization of vacancy ordering in Ge-Sb-Te phase-change memory alloys

Fundamental Research 4, 11235 (2024)

[396] Y. Liu, X. Zhang, P. Nan, B. Zou, Q. Zhang, Y. Hou, S. Li, Y. Gong, Q. Liu, B. Ge, O. Cojocaru-Mirédin, Y. Yu, Y. Zhang, M. Wuttig, G. Tang

Improved Solubility in Metavalently Bonded Solid Leads to Band Alignment, Ultralow Thermal Conductivity, and High Thermoelectric Performance in SnTe
Advanced Functional Materials **2209980**, (2022)

[395] J. Pries, C. Stenz, L. Schäfer, A. Gutsche, S. Wei, P. Lucas, M. Wuttig
Resistance Drift Convergence and Inversion in Amorphous Phase Change Materials
Advanced Functional Materials, **2207194**, (2022)

[394] Y. Yu, C. Zhou, X. Zhang, L. Abdellaoui, C. Doberstein, B. Berkels, B. Ge, G. Qiao, C. Scheu, M. Wuttig, O. Cojocaru-Mirédin, S. Zhang
Dynamic doping and Cottrell atmosphere optimize the thermoelectric performance of n-type PbTe over a broad temperature interval
Nano Energy **101**, **107576** (2022)

[393] P. Kerres, Y. Zhou, H. Vaishnav, M. Raghuwanshi, J. Wang, M. Häser, M. Pohlmann, Y. Cheng, C.-F. Schön, T. Jansen, C. Bellin, D. E. Bürgler, A. R. Jalil, C. Ringkamp, H. Kowalczyk, C. M. Schneider, A. Shukla, M. Wuttig
Scaling and Confinement in Ultrathin Chalcogenide Films as Exemplified by GeTe
Small, **2201753** (2022)

[392] J. Pries, H. Weber, J. Benke-Jacob, I. Kaban, S. Wei, M. Wuttig, P. Lucas
Fragile-to-Strong Transition in Phase-Change Material $\text{Ge}_3\text{Sb}_6\text{Te}_5$
Advanced Functional Materials, **2202714** (2022)

[391] A. Heßler, L. Conrads, K. Wirth, M. Wuttig and T. Taubner
Reconfiguring magnetic infrared resonances with the plasmonic phase-change material In_3SbTe_2
ACS Photonics **9**, **1821** (2022)

[390] A. Heßler, S. Wahl, P.T. Kristensen, M. Wuttig, K. Busch and T. Taubner
Nanostructured In_3SbTe_2 Antennas enable switching from broad dielectric to sharp plasmonic resonances
Nanophotonics **0041**, (2022)

[389] S. Parhizkar, M. Pechtl, A.-L. Giesecke, S. Suckow, S. Wahl, S. Lukas, O. Hartwig, N. Negm, A. Quellmalz, K. Gylfason, D. Schall, M. Wuttig, G.S. Duesberg, M. C. Lemme
Two-Dimensional Platinum Diselenide Waveguide-Integrated Infrared Photodetectors
ACS Photonics **9**, **859** (2022)

[388] P. Lucas, J. Pries, S. Wie and M. Wuttig
The glass transtion of water, insight from phase change materials
Journal of Non-Crystalline Solids: X **14**, **100084** (2022)

[387] S. Abdollahramezani, O. Hemmatyar, M. Taghinejad, H. Taghinejad, A. Krasnok, A.A Eftekhari, C. Teichrib, S. Deshmukh, M. El-Sayed, E. Pop, M. Wuttig, A. Alu, W. Cai, A. Adibi
Electrically driven programmable phase-change meta-switch reaching 80% efficiency
Nature Communications **13**, **1696** (2022)

[386] V. Evang, J. Reindl, L. Schäfer, A. Rochotzki, P. Pletzer-Zelgert, M. Wuttig, R. Mazzarello
Thermally Controlled Charge-Carrier Transitions in Disordered PbSbTe Chalcogenides
Advanced Materials **33**, **2106868** (2021)

- [385] M.J. Müller, A. Yadav, C. Persch, S. Wahl, F. Hoff and M. Wuttig
Tailoring Crystallization Kinetics of Chalcogenides for Photonic Applications
Advanced Electronic Materials, **2100974** (2021)
- [384] J. Barnett, L. Wehmeier, A. Heßler, M. Lewin, J. Pries, M. Wuttig, J. M. Klopff, S.C. Kehr, L.M. Eng, and T. Taubner¹
Far-infrared Near-field Optical Imaging and Kelvin Probe Force Microscopy of Laser-crystallized and -amorphized Phase Change Material Ge₃Sb₂Te₆
Nano Letters **21**, **9012** (2021)
- [383] D. An, J. Wang, J. Zhang, X. Zhai, Z. Kang, W. Fan, J. Yan, Y. Liu, L. Lu, C.-L. Jia, M. Wuttig, O. Cojocaru-Mirédin, S. Chen, W. Wang, G.J. Snyder and Y. Yu
Retarding Ostwald ripening through Gibbs adsorption and interfacial complexions leads to high-performance SnTe thermoelectrics
Energy & Environmental Science **14**, **5469** (2021)
- [382] A. Heßler, I. Bente, M. Wuttig, T. Taubner
Ultra-thin switchable absorbers based on lossy phase-change materials
Advanced Optical Materials, **202101118**, (2021)
- [381] C. Zhang, X. Geng, B. Chen, J. Li, A. Meledin, L. Hu, F. Liu, J. Shi, J. Mayer, M. Wuttig, O. Cojocaru-Mirédin and Y. Yu
 Boron-Mediated Grain Boundary Engineering Enables Simultaneous Improvement of Thermoelectric and Mechanical Properties in N-Type Bi₂Te₃
Small **17**, 202104067 (2021)
- [380] K. Zhang, M. Xu, N. Li, M. Xu, Q. Zhang, E. Greenberg, V.B. Prakapenka, Y.-S. Chen, M. Wuttig, H.-K. Mao, W. Yang
Superconducting Phase induced by a Local Structure Transition in Amorphous Sb₂Se₃ under High Pressure
Physical Review Letters **127**, **127002** (2021)
- [379] M.T. Agne, P. Jost, F.R.L. Lange, J.P. Male, K.S. Siegert, H. Volker, C. Poltorak, A. Poitz, T. Siegrist, S. Maier, G.J. Snyder, M Wuttig
 Anderson-like localization for bidimensional thermoelectrics optimization
Matter **4**, **2970** (2021)
- [378] G. Bai, Y. Yu, X. Wu, J. Li, Y. Xie, L. Hu, F. Liu, M. Wuttig, O. Cojocaru-Mirédin and C. Zhang
Boron strengthened GeTe-based alloys for robust thermoelectric devices with high output power density
Advanced Energy Materials, **2102012** (2021)
- [377] J.-Y. Raty, C. Gatti, C.-F. Schön, M. Wuttig
How to Identify Lone Pairs, van der Waals Gaps and Metavalent Bonding using Charge and Pair Density Methods: From Elemental Chalcogens to Lead Chalcogenides and Phase Change Materials
Physica Status Solidi: Rapid Research Letters, **200534** (2021)
- [376] N. Amini, J. Pries, Y. Cheng, C. Persch, M. Wuttig, M. Stolpe, S. Wei
Thermodynamics and Kinetics of Glass and Liquid Phase Change Materials
Materials Science in Semiconductor Processing **135**, **106094** (2021)

[375] C. Zhou, Y. K. Lee, Y. Yu, S. Byun, Z.-Z. Luo, H. Lee, B. Ge, Y.-L. Lee, X. Chen, J.-Y. Lee, O. Cojocaru-Mirédin, H. Chang, J. Im, S.-P. Cho, M. Wuttig, V. Dravid, M. Kanatzidis
Ultrahigh thermoelectric figure of merit in polycrystalline SnSe
Nature Materials 20, 1378 (2021)

[374] J. Pries, J. Sehringer, S. Wei, P. Lucas, M. Wuttig
Glass Transition of the Phase Change Material AIST and its Impact on Crystallization
Materials Science in Semiconductor Processing 134, 105990 (2021)

[373] X. Lyu, A. Heßler, X. Wang, Y. Cao, L. Song, A. Ludwig, M. Wuttig, T. Taubner
Combining phase-change materials and phase-transition materials for thermally regulated smart mid-infrared modulators
Advanced Optical Materials 2100417 (2021)

[372] T. Luo, J.J. Kuo, K.J. Griffith, K. Imasato, O. Cojocaru-Mirédin, M. Wuttig, B. Gault, Y. Yu, and G.J. Snyder
Nb-mediated grain growth and grain-boundary engineering in Mg_3Sb_2 -based thermoelectric materials
Advanced Functional Materials 2100258 (2021)

[371] D. Dorow-Gerspach, D. Mergel and M. Wuttig
Effects of Different Amounts of Nb Doping on Electrical, Optical and Structural Properties in Sputtered TiO_{2-x} Films
Crystals 11, 301 (2021)

[370] P. Noe, B. Kooi, M. Wuttig
Phase Change and Ovonic Materials
Physica Status Solidi: Rapid Research Letters 2100078 (2021)

[369] M. Wuttig, C.-F. Schön, M. Schumacher, J. Robertson, P. Golub, E. Bousquet, C. Gatti, J.-Y. Raty
Halide perovskites: third generation photovoltaic materials empowered by an unconventional bonding mechanism
Advanced Functional Materials 202110166 (2021)

[368] C. Persch, M. Müller, A. Yadav, N. Honne, J. Pries, S. Wei, P. Fantini, E. Varesi, F. Pelizzer, M. Wuttig
The Role of Chemical Bonding to Design Crystallization and Vitrification Kinetics
Nature Communications 12, 4978 (2021)

[367] Y. Xu, X. Wang, W. Zhang, L. Schäfer, J. Reindl, F. vom Bruch, Y. Zhou, V. Evang, J.-J. Wang, V.L. Deringer, E. Ma, M. Wuttig, R. Mazzarello
Materials screening for disorder-controlled chalcogenide crystals for phase-change memory applications
Advanced Materials 33, 2006221 (2021)

[366] L. Guarneri, S. Jakobs, A. von Hoegen, S. Maier, M. Xu, M. Zhu, S. Wahl, C. Teichrib, Y. Zhou, O. Cojocaru-Mirédin, M. Raghuwanshi, C.-F. Schön, M. Drögel, C. Stampfer, R. P. S. M. Lobo, A. Piarristeguy, A. Pradel, J.-Y. Raty, M. Wuttig
Metavalent bonding in crystalline solids: how does it collapse?
Advanced Materials 33, 2102356 (2021)

[365] Y. Cheng, S. Wahl, M. Wuttig

Metavalent Bonding in Solids: Characteristic Representatives, Their Properties and Design Options

Physica Status Solidi: Rapid Research Letters 2000482 (2020)

[364] J. Pries, Y. Yu, P. Kerres, M. Häser, S. Steinberg, F. Gladisch, S. Wei, P. Lucas, M. Wuttig

Approaching the Glass Transition Temperature of GeTe by Crystallizing Ge₁₅Te₈₅

Physica Status Solidi: Rapid Research Letters 202000478 (2020)

[363] A. Heßler, S. Wahl, T. Leuteritz, A. Antonopoulos, C. Stergianou, C.-F. Schön, L. Naumann, N. Eicker, M. Lewin, T.W.W. Maß, M. Wuttig, S. Linden, T. Taubner

In₃SbTe₂ as a Programmable Nanophotonics Material Platform for the Infrared

Nature Communications 12, 924 (2021)

[362] J. Wang, C. Zhou, Y. Yu, Y. Zhou, L. Lu, B. Ge, Y. Cheng, C.-L. Jia, R. Mazzarello, Z. Shi, M. Wuttig, W. Zhang

Enhancing thermoelectric performance of Sb₂Te₃ through swapped bilayer defects

Nano Energy 79, 105484 (2021)

[361] P. Zalden, C. Koch, M. Paulsen, M. Esters, D.C. Johnson, M. Wuttig, A.M. Lindenberg, W. Bensch

Acceleration of Crystallization Kinetics in Ge-Sb-Te-Based

Phase-Change Materials by Substitution of Ge by Sn

Advanced Functional Materials 31, 2004803 (2020)

[360] S. Maier, S. Steinberg, Y. Cheng, Carl-Friedrich Schön, M. Schumacher, R.

Mazzarello, P. Golub, R. Nelson, O. Cojocaru-Mirédin, J.-Y. Raty, M. Wuttig

Discovering electron transfer driven changes in chemical bonding in lead chalcogenides (PbX, where X = Te, Se, S, O)

Advanced Materials 32, 202005533 (2020)

[359] C. Zhou, Y. Yu, Y.-L. Lee, B. Ge, W. Lu, O. Cojocaru-Miredin, J. Im, S.-P. Cho, M. Wuttig, Z. Shi, I. Chung

Exceptionally High Average Power Factor and Thermoelectric Figure of Merit in n-type PbSe by the Dual Incorporation of Cu and Te

J. Am. Chem. Soc. 142, 15172 (2020)

[358] S. Wei, C. Persch, M. Stolpe, Z. Evenson, G. Coleman, P. Lucas, M. Wuttig

Violation of the Stokes-Einstein relation in Ge₂Sb₂Te₅, GeTe Ag₄In₃Sb₆₇Te₂₆, and Ge₁₅Sb₈₅, and its connection to fast crystallization

Acta Materialia 195, 491 (2020)

[357] I. Ronneberger, Z. Zanolli, M. Wuttig, R. Mazzarello

Changes of Structure and Bonding with Thickness in Chalcogenide Thin Films

Advanced Materials 32, 2001033 (2020)

[356] A. Leitis, A. Heßler, S. Wahl, M. Wuttig, T. Taubner, A. Tittl, H. Altug

All-dielectric programmable Huygens' metasurfaces

Advanced Functional Materials 31, 1910259 (2020)

[355] B.J. Kooi and M. Wuttig

Chalcogenides by Design: Functionality Through Metavalent Bonding and Confinement

Advanced Materials 32, 1908302 (2020)

- [354] C. Rodenkirchen, M. Cagnoni, S. Jakobs, Y. Cheng, J. Keutgen, Y. Yu, M. Wuttig, O. Cojocaru-Mirédin
Employing interfaces with metavalently bonded materials for phonon scattering and control of the thermal conductivity in TAGS-x Thermoelectric Materials
Advanced Functional Materials 31, 1910039 (2020)
- [353] T.-T. Jiang, X.-D. Wang, J.-J. Wang, Y.-X. Zhou, D.-L. Zhang, L. Lu, C.-L. Jia, M. Wuttig, R. Mazzarello, W. Zhang
In situ study of vacancy disordering in crystalline phase-change materials under electron beam irradiation
Acta Materialia 187, 103 (2020)
- [352] J.-Y. Raty and M. Wuttig
The interplay between Peierls distortions and metavalent bonding in IV-VI compounds: comparing GeTe with related monochalcogenides
J. Phys. D 53, 234002 (2020)
- [351] C. Zhou, Y. Yu, X. Zhang, Y. Cheng, J. Xu, Y.K. Lee, B. Yoo, O. Cojocaru-Mirédin, G. Liu, S.-P. Cho, M. Wuttig, T. Hyeon, I. Chung
Cu Intercalation and Br Doping to Thermoelectric SnSe₂ Lead to Ultrahigh Electron Mobility and Temperature-Independent Power Factor
Advanced Functional Materials 30, 1908405 (2019)
- [350] M. Raghuwanshi, O. Cojocaru-Mirédin, M. Wuttig,
Investigating bond rupture in resonantly bonded solids by field evaporation of carbon nanotubes
Nano Letters 20, 116 (2020)
- [349] A.M. Mio, S. Privitera, M. Zimbone, V. Bragaglia, S. Jakobs, C. Persch, F. Arciprete, R. Calarco, M. Wuttig, E. Rimini,
Disordering processes of GeSb₂Te₄ induced by ion irradiation
J. Phys. D 53, 134001 (2020)
- [348] N. Saxena, C. Persch, M. Wuttig and A. Manivannan
Exploring ultrafast threshold switching in In₃SbTe₂ phase change memory devices
Scientific Reports 9, 19251 (2019)
- [347] J. Pries, S. Wei, F. Hoff, P. Lucas, M. Wuttig
Control of Effective Cooling Rate upon Magnetron Sputter Deposition of Glassy Ge₁₅Te₈₅
Scripta Materialia 178, 223 (2020)
- [346] J. Reindl, H. Volker, N.P. Breznay, M. Wuttig
Persistence of spin memory in a crystalline, insulating phase-change material
npj Quantum Materials 4, 57 (2019)
- [345] S.-X. Peng, Y. Cheng, Julian Pries, Shuai Wei, Hai-Bin Yu, M. Wuttig
Uncovering β -relaxations in amorphous phase-change materials
Science Advances 6, eaay6726 (2020).
- [344] N. C. Passler, A. Hessler, M. Wuttig, M. Wolf, T. Taubner, A. Paarmann
Surface Polariton-Like s-Polarized Waveguide Modes in Switchable Dielectric Thin-Films on Polar Crystals
Advanced Optical Materials, 1901056 (2019)
- [343] J. Pries, O. Cojocaru-Mirédin, and M. Wuttig

Phase-change materials: Empowered by an unconventional bonding mechanism
MRS BULLETIN 44, 699 (2019)

[342] Carlos M.M. Rosario, B. Thöner, A. Schönhals, S. Menzel, A. Meledin, N.P. Barradas, E. Alves, J. Mayer, M. Wuttig, R. Waser, N.A. Sobolev, D.J. Wouters
Metallic filamentary conduction in valence change-based resistive switching devices: the case of TaOx thin film with $x \sim 1$
Nanoscale, DOI: 10.1039/C9NR05285B, (2019)

[341] Y. Cheng, O. Cojocaru-Mirédin, J. Keutgen, Y. Yu, M. Küpers, M. Schumacher, P. Golub, J.-Y. Raty, R. Dronskowski, M. Wuttig
Understanding the structure and properties of sesqui-chalcogenides (i.e. V_2VI_3 or Pn_2Ch_3 (Pn = pnictogen, Ch = chalcogen) compounds) from a bonding perspective
Advanced Materials 31, 1904316 (2019)

[340] J. Pries, S. Wei, M. Wuttig, P. Lucas
Switching between Crystallization from the Glassy and the Undercooled Liquid Phase in Phase Change Material $Ge_2Sb_2Te_5$
Advanced Materials 31, 1900784 (2019)

[339] Y. Yu, M. Cagnoni, O. Cojocaru-Mirédin, M. Wuttig
Chalcogenide thermoelectrics empowered by an unconventional bonding mechanism
Advanced Functional Materials 29, 1904862 (2019)

[338] A.M. Mio, P.M. Konze, A. Meledin, M. Küpers, M. Pohlmann, M. Kaminski, R. Dronskowski, J. Mayer, M. Wuttig
Impact of Bonding on the Stacking Defects in Layered Chalcogenides
Advanced Functional Materials 29, 1902332 (2019)

[337] J.-J. Wang, J. Wang, Y. Xu, T. Xin, Z. Song, M. Pohlmann, M. Kaminski, L. Lu, H. Du, C.-L. Jia, R. Mazzarello, M. Wuttig, W. Zhang
Layer Switching mechanisms in Sb_2Te_3
Phys. Status Solidi RRL 13, 1900320 (2019)

[336] M. Zhu, W. Song, P.M. Konze, T. Li, B. Gault, X. Chen, J. Shen, S. Lv, Z. Song, M. Wuttig, R. Dronskowski
Direct Atomic Insights into the role of dopants in phase-change materials
Nature Communications 10, 3525 (2019)

[335] Y. Yu, C. Zhou, S. Zhang, M. Zhu, C. Scheu, D. Raabe, G.J. Snyder, M. Wuttig, B. Gault, O. Cojocaru-Mirédin
Revealing nano-chemistry at lattice defects in thermoelectric materials using atom probe tomography
Materials Today 32, 260 (2020)

[334] L. Jung, J. Pries, T. Maß, M. Lewin, D. Boyuk, A. Mohabir, M. Filler, M. Wuttig, T. Taubner
Quantification of carrier density gradients along axially-doped silicon nanowires using infrared nanoscopy
ACS Photonics 6, 1744 (2019)

[333] J.J. Kuo, Y. Yu, D. Kang, O. Cojocaru-Mirédin, M. Wuttig, J. Snyder
Mg deficiency in grain boundaries of n-type Mg_3Sb_3 identified by atom probe tomography
Advanced Materials Interfaces, 1900429 (2019)

[332] K. Chaudhary, M. Tamagnone, X. Yin, C.M. Spägle, S.L. Oscurato, J. Li, C. Persch, R. Li, N.A. Rubin, L.A. Jauregui, K. Watanabe, T. Taniguchi, P. Kim, M. Wuttig, J. H. Edgar, A. Ambrosio, F. Capasso
Polariton Nanophotonics using Phase Change Materials
Nature Communications 10, 4487 (2019)

[331] A.-K. U. Michel, A. Hessler, S. Meyer, J. Pries, Y. Yu, T. Kalix, M. Lewin, J. Hanss, A. De Rose, T.W.W. Maß, M. Wuttig, D.N. Chigrin and T. Taubner
Advanced optical programming of individual meta-atoms beyond the effective medium approach
Advanced Materials 31, 1901033 (2019)

[330] P. Zalden, F. Quirin, M. Schumacher, J. Siegel, S. Wei, A. Koc, M. Nicoul, M. Trigo, P. Andreasson, H. Enquist, M. Shu, T. Pardini, M. Chollet, D. Zhu, H. Lemke, I. Ronneberger, J. Larsson, A. M. Lindenberg, H. E. Fischer, S. Hau-Riege, D. A. Reis, R. Mazzarello, M. Wuttig and K. Sokolowski-Tinten
Femtosecond X-ray diffraction reveals a liquid-liquid phase transition in phase-change materials
Science 364, 1062 (2019)

[329] W. Zhang, M. Wuttig
Phase Change Materials and Superlattices for Non-Volatile Memories
Phys. Status Solidi RRL 13, 1900130 (2019)

[328] H. Sumikura, T. Wang, P. Li, A. Michel, A. Hessler, L. Jung, M. Lewin, M. Wuttig, D. Chigrin, T. Taubner
Highly-Confined and Switchable Mid-Infrared Surface Phonon Polariton Resonances of Planar Circular Cavities with a Phase Change Material
Nano Letters 19, 2549 (2019)

[327] H. Hollermann, F.R.L. Lange, S. Jakobs, P. Kerres, M. Wuttig
Stoichiometry determination of chalcogenide superlattices by means of X-ray diffraction and its limits
Phys. Status Solidi RRL 13, 1800577 (2019)

[326] M. Dück, T. Schäfer, S. Jakobs, C.-F. Schön, H. Niehaus, O. Cojocar-Mirédin, M. Wuttig
Disorder Control in Crystalline GeSb₂Te₄ and its Impact on Characteristic Length Scales
Phys. Status Solidi RRL 13, 1800578 (2019)

[325] O. Cojocar-Mirédin, H. Hollermann, A. Mio, A. Wang, M. Wuttig
Role of grain boundaries in Ge-Sb-Te based chalcogenide superlattices
Journal of Physics: Condensed Matter 31, 204002 (2019)

[324] M. Lewin, L. Mester, T. Saltzmann, S.-J. Chong, M. Kaminski, B. Hauer, M. Pohlmann, A.M. Mio, M. Wirtsohn, P. Jost, M. Wuttig, U. Simon, and T. Taubner
Sb₂Te₃ growth study reveals: Formation of Nanoscale Charge Carrier Domains Is an Intrinsic Feature Relevant for Electronic Applications
ACS Appl. Nano Materials 1, 6834 (2018)

[323] J.-Y. Raty, M. Schumacher, P. Golub, V.L. Deringer, C. Gatti, and M. Wuttig
A Quantum-Mechanical Map for Bonding and Properties in Solids
Advanced Materials 31, 1806280 (2019)

[322] W. Zhang, R. Mazzarello, M. Wuttig, E. Ma

Designing crystallization in phase-change materials for universal memory and neuro-inspired computing

Nature Materials Review 4, 150 (2019)

[321] A. Sheskin, T. Schwarz, Y. Yu, S. Zhang, L. Abdellaoui, B. Gault, O. Cojocaru-Miredin, C. Scheu, D. Raabe, M. Wuttig, Y. Amouyal

Tailoring Thermoelectric Transport Properties of Ag-Alloyed PbTe: Effects of Microstructure Evolution

ACS Applied Materials & Interfaces 10, 38994 (2018)

[320] D. Dorow-Gerspach, M. Wuttig

Metal-like conductivity in undoped TiO_{2-x} : Understanding an unconventional transparent conducting oxide

Thin Solid Films 669, 1 (2019)

[319] C. Zhou, Y. Yu, Y.K. Lee, O. Cojocaru-Miredin, B. Yoo, S.-P. Cho, J. Im, M. Wuttig, T. Hyeon, I. Chung

High Performance n-type PbSe-Cu₂Se Thermoelectrics through Conduction Band Engineering and Phonon Softening

J. Am. Chem. Soc., 140, 15535 (2018)

[318] M. Wuttig, V.L. Deringer, X. Gonze, C. Bichara, J.-Y. Raty

Incipient Metals: Functional Materials with a Unique Bonding Mechanism

Advanced Materials 30, 1803777 (2018)

[317] S. Privitera, A.M. Mio, M. Dück, C. Persch, M. Zimbone, M. Wuttig, E. Rimini, *Atomic disordering processes in crystalline GeTe induced by ion irradiation*

Journal of Physics D: Applied Physics 51, 495103 (2018)

[316] M. Küpers, P.M. Konze, A. Meledin, J. Mayer, U. Englert, M. Wuttig, R. Dronskowski *Controlled crystal growth of indium selenide, In_2Se_3 , and the crystal structures of $\alpha\text{-In}_2\text{Se}_3$*

Inorganic Chemistry 57, 11775 (2018)

[315] J. Wang, J. Wang, H. Du, L. Lu, P. C. Schmitz, J. Reindl, A. M. Mio, C. Jia, E. Ma, R. Mazzarello, M. Wuttig, and W. Zhang

Genesis and effects of swapping bi-layers in hexagonal GeSb_2Te_4

Chemistry of Materials 30, 4770 (2018)

[314] J. Rittich, S. Jung, J. Siekmann, M. Wuttig

Indium-Tin-Oxide (ITO) Work Function Tailoring by Covalently Bound Carboxylic Acid Self-Assembled Monolayers

Physica Status Solidi B 255, 1800075, (2018)

[313] M. Cagnoni, D. Führen and M. Wuttig

Thermoelectric performance of IV-VI compounds with octahedral-like coordination: a chemical-bonding perspective

Advanced Materials 30, 1801787 (2018)

[312] J. Rittich, S. Jung, D. Meyer, C. Jodocy, M. Wuttig

Surface Modifications by Self-Assembled Monolayers to Improve Organic Opto-Electronic Devices

in K. Wandelt (Ed.), Encyclopedia of Interfacial Chemistry: Surface Science and Electrochemistry 4, 835–841 (2018)

[311] C.M.M. Rosário, B. Thöner, A. Schönhals, S. Menzel, M. Wuttig, R. Waser, N. A. Sobolev, D. J. Wouters

Correlation between the transport mechanisms in conductive filaments inside Ta₂O₅-based resistive switching devices and in substoichiometric TaO_x thin films
Applied Physics Letters 112, 213504 (2018)

[310] C. Koch, T. Dankwort, A. Hansen, M. Esters, D. Häußler, H. Volker, A. von Hoegen, M. Wuttig, D.C. Johnson, W. Bensch, L. Kienle
Investigation of the Phase Change Mechanism of Ge₆Sn₂Sb₂Te₁₁
Acta Materialia 152, 278 (2018)

[309] M. Raghuwanshi, B. Thöner, P. Soni, M. Wuttig, R. Wuerz, and O. Cojocaru-Mirédin
Evidence of Enhanced Carrier Collection in Cu(In,Ga)Se₂ Grain Boundaries: Correlation with Microstructure
ACS Applied Materials & Interfaces 10, 14759 (2018)

[308] J. Wang, I. Ronneberger, L. Zhou, L. Lu, V.L. Deringer, B. Zhang, L. Tian, H. Du, C. Jia, X. Qian, M. Wuttig, R. Mazzarello, and W. Zhang
Unconventional two-dimensional germanium dichalcogenides
Nanoscale 10, 7363 (2018)

[307] M. Zhu, O. Cojocaru-Mirédin, A.M. Mio, J. Keutgen, M. Küpers, Y. Yu, J.Y. Cho, R. Dronskowski, and M. Wuttig
Unique bond breaking in crystalline phase change materials and the quest for metavalent bonding
Advanced Materials 30, 1706735 (2018)

[306] Y. Yu, S. Zhang, A. M. Mio, B. Gault, A. Sheskin, M. Zhu, C. Scheu, D. Raabe, F. Zu, M. Wuttig, Y. Amouyal, and O. Cojocaru-Mirédin
Ag-segregation to dislocations in PbTe-based thermoelectric materials
ACS Applied Materials & Interfaces 10, 3609 (2018)

[305] R. Wang, F.R.L. Lange, S. Cecchi, M. Hanke, M. Wuttig, R. Calarco
2D or not 2D: Strain tuning in weakly coupled heterostructures
Advanced Functional Materials 28, 1705901 (2018)

[304] M. Xu, S. Jakobs, R. Mazzarello, Ju-Young Cho, Z. Yang, H. Hollermann, D. Shang, X. Miao, Z. Yu, L. Wang, M. Wuttig
Impact of Pressure on the resonant Bonding in Chalcogenides
J. Phys. Chem. C 121, 25447 (2017)

[303] C. Koch, G. Schienke, M. Paulsen, D. Meyer, M. Wimmer, H. Volker, M. Wuttig, W. Bensch
Investigating the Influence of Resonant Bonding on the Optical Properties of Phase Change Materials Ge₁₀SnSb₂Se₄
Chemistry of Materials 29, 9320 (2017)

[302] M. Wuttig, H. Bhaskaran, and T. Taubner
Phase Change Materials for Photonic Applications
Nature Photonics 11, 465 (2017)

[301] Tobias Schäfer, Philipp M. Konze, Jonas D. Huyeng, Volker L. Deringer, Thibault Lesieur, Paul Müller, Markus Morgenstern, Richard Dronskowski, and Matthias Wuttig
Chemical Tuning of Carrier Type and Concentration in a Homologous Series of Crystalline Chalcogenides
Chemistry of Materials 29, 6749 (2017)

[300] Jiangjing Wang, Yazhi Xu, Riccardo Mazzarello, Matthias Wuttig, Wei Zhang
A review on disorder-driven metal-insulator transition in crystalline Ge₁Sb₂Te₄ phase-change material

Materials 10, 862 (2017)

[299] A. Michel, M. Wuttig and T. Taubner

Design parameters for phase-change materials for nanostructure resonance tuning
Advanced Optical Materials, 1700261 (2017)

[298] S. Privitera, A. M. Mio, W. Zhang, R. Mazzarello, C. Persch, M. Wuttig and E. Rimini
Strain development and damage accumulation under ion irradiation of polycrystalline Ge-Sb-Te Alloys

Nanoscience and Nanotechnology Letters 9, 1095 (2017)

[297] Yuan Yu, Dong-sheng He, Siyuan Zhang, Oana Cojocaru-Mirédin, Torsten Schwarz, Andreas Stoffers, Xiao-yu Wang, Shu-qi Zheng, Bin Zhu, Christina Scheu, Jia-qing He, Matthias Wuttig, Zhong-yue Huang and Fang-qiu Zu

Simultaneous Optimization of Electrical and Thermal Transport Properties of Bi_{0.5}Sb_{1.5}Te₃ Thermoelectric Alloy by Twin-Dominant Structure Engineering
Nano Energy 37, 203 (2017)

[296] Xinghui Yin, Tobias Steinle, Lingling Huang, Thomas Taubner, Matthias Wuttig, Thomas Zentgraf, and Harald Giessen

Beam switching and bifocal lensing using active plasmonic metasurfaces
Light: Science & Applications 6, e1016 (2017)

[295] O. Cojocaru-Mirédin, L. Abdellaoui, M. Nagli, Y. Yu, C. Scheu, D. Raabe, M. Wuttig, and Y. Amouyal

Role of Nanostructuring in Silver Antimony Telluride Compounds for Thermoelectric Applications
ACS Applied Materials & Interfaces 9, 14779 (2017)

[294] R. Wang, W. Zhang, J. Momand, I. Ronneberger, J.E. Boschker, R. Mazzarello, B.J. Kooi, H. Riechert, M. Wuttig, R. Calarco

Formation of Resonant Bonding during Growth of Ultrathin GeTe Films
NPG Asia Materials 9, e396 (2017)

[293] C. Koch, A.-L. Hansen, T. Dankwort, G. Schienke, M. Paulsen, D. Meyer, M. Wimmer, M. Wuttig, L. Kienle, and W. Bensch

Enhanced temperature stability and exceptionally high electrical contrast of selenium substituted Ge₂Sb₂Te₅ phase change materials
RSC Advances 7, 17164 (2017)

[292] M. Küpers, P.M. Konze, S. Maintz, S. Steinberg, A.M. Mio, O. Cojocaru-Mirédin, M. Zhu, M. Müller, M. Luysberg, J. Mayer, M. Wuttig, and R. Dronskowski

Unexpected Ge–Ge interactions in the two-dimensional Ge₄Se₃Te phase and analysis of their chemical cause with the Density of Energy Functional
Angewandte Chemie Int. Ed. 56, 10204 (2017)

[291] R.A. Henning, T. Leichtweiss, D. Dorow-Gerspach, R. Schmidt, N. Wolff, U. Schurmann, Y. Decker, L. Kienle, M. Wuttig, J. Janek,

Phase formation and stability in TiO_x and ZrO_x thin films: Extremely sub-stoichiometric functional oxides for electrical and TCO applications
Z. Kristallogr. 232, 161–183 (2017)

[290] C. Chen, P. Jost, H. Volker, M. Kaminski, M. Wirtsohn, U. Engelmann, K. Krüger, F. Schlich, C. Schlockermann, R.P.S.M. Lobo, M. Wuttig

Dielectric properties of amorphous phase-change materials
Phys. Rev. B 95, 094111 (2017)

- [289] A. Caretta, B. Casarin, P. Di Pietro, A. Perucchi, S. Lupi, V. Bragaglia, R. Calarco, F.R.L. Lange, M. Wuttig, F. Parmigiani, M. Malvestuto
Interband characterization and electronic transport control of nanoscaled GeTe/Sb₂Te₃ superlattices
Phys. Rev. B **94**, 045319 (2016)
- [288] R. Wang, D. Campi, M. Bernasconi, J. Momand, B.J. Kooi, M.A. Verheijen, M. Wuttig, R. Calarco
Ordered Peierls distortion prevented at growth onset of GeTe ultra-thin films
Scientific Reports **6**, 32895 (2016)
- [287] J. Momand, F. Lange, R. Wang, J. Boschker, M. Verheijen, R. Calarco, M. Wuttig, B. Kooi
Atomic stacking and van-der-Waals bonding in GeTe-Sb₂Te₃ superlattices
Journal of Materials Research **20**, 3115 (2016)
- [286] D. Meyer, T. Schäfer, P. Schulz, S. Jung, J. Rittich, D. Mokros, I. Segger, F. Maerks, C. Effertz, R. Mazzarello, M. Wuttig
Dithiocarbamate Self-Assembled Monolayers as Efficient Surface Modifiers for Low-Work Function Noble Metals
Langmuir **32**, 8812 (2016)
- [285] P. Zalden, M.J. Shu, F. Chen, X. Wu, Y. Zhu, H. Wen, S. Johnston, Z.X. Shen, P. Landmann, M. Brongersma, S.W. Fong, H.S.P. Wong, M.-J. Sher, P. Jost, M. Kaes, M. Salinga, A. von Hoegen, M. Wuttig, A.M. Lindenberg
Picosecond Electric-Field-Induced Threshold Switching in Phase-Change Materials
Physical Review Letters **117**, 067601 (2016)
- [284] P. Li, X. Yang, T.W. Maß, J. Hanss, M. Lewin, A.-K. U. Michel, M. Wuttig, T. Taubner
Reversible optical switching of highly confined phonon–polaritons with an ultrathin phase-change material
Nature Materials **15**, 870 (2016)
- [283] B. Zhang, W. Zhang, Z. Shen, Y. Chen, J. Li, S. Zhang, Z. Zhang, M. Wuttig, R. Mazzarello, E. Ma, and X. Han
Element-resolved atomic structure imaging of rocksalt Ge₂Sb₂Te₅ phase-change material
Applied Physics Letters **108**, 191902 (2016)
- [282] B. Casarin, A. Caretta, J. Momand, B. J. Kooi, M. A. Verheijen, V. Bragaglia, R. Calarco, M. Chukalina, X. Yu, J. Robertson, F. R. L. Lange, M. Wuttig, A. Redaelli, E. Varesi, F. Parmigiani, M. Malvestuto
Revisiting the Local Structure in Ge-Sb-Te based Chalcogenide Superlattices
Scientific Reports **6**, 22353 (2016)
- [281] M. Xu, W. Zhang, R. Mazzarello, M. Wuttig
Reversing the resistivity contrast in disorder control in Crystalline Ge₁Sb₂Te₄ using High Pressure
Advanced Science **2**, 1500117 (2015)
- [280] M. Rütten, M. Kaes, A. Albert, M. Wuttig, M. Salinga
Relation between bandgap and resistance drift in amorphous phase change materials
Scientific Reports **5**, 7362 (2015)
- [279] R. Waser, M. Wuttig
Resistively Switching Chalcogenides

Advanced Functional Materials 25, 6285 (2015)

[278] M. Lewin, B. Hauer, M. Bornhöfft, L. Jung, J. Benke, A.-K. U. Michel, J. Mayer, M. Wuttig, T. Taubner
Imaging of phase change materials below a capping layer using correlative infrared near-field microscopy and electron microscopy

Appl. Phys. Lett. 107, 151902 (2015)

[277] W. Zhang, M. Wuttig, R. Mazzarello,
Effects of stoichiometry on the transport properties of crystalline phase-change materials
Scientific Reports 5, 13496 (2015)

[276] W. Zhang, V. Deringer, R. Dronskowski, R. Mazzarello, E. Ma, M. Wuttig
Density functional theory guided advances in phase-change materials and memories
MRS Bulletin 40, 856 (2015)

[275] V. Deringer, W. Zhang, P. Rausch, R. Mazzarello, R. Dronskowski, M. Wuttig
A chemical link between Ge–Sb–Te and In–Sb–Te phase-change materials
Journal of Materials Chemistry C 3, 9519 (2015)

[274] P. Zalden, A. von Hoegen, P. Landreman, M. Wuttig, A. Lindenberg
How supercooled liquid Phase-Change Materials crystallize: snapshots after femtosecond optical excitation
Chemistry of Materials 27, 5641 (2015)

[273] D. J. Wouters, R. Waser, M. Wuttig
Phase-Change and Redox-Based Resistive Switching Memories
Proceedings of the IEEE 103, 1274 (2015)

[272] V. Deringer, R. Stoffel, M. Wuttig, R. Dronskowski
Vibrational Properties and bonding nature of Sb₂Se₃ and their implications for chalcogenide materials
Chemical Science 6, 5255 (2015)

[271] X. Yin, M. Schäferling, A.-K. U. Michel, A. Tittl, M. Wuttig, T. Taubner, H. Giessen
Active Chiral Plasmonics
Nano Letters 15, 4255 (2015)

[270] A. Tittl, A.-K. U. Michel, M. Schäferling, X. Yin, B. Gholipour, L. Cui, M. Wuttig, T. Taubner, F. Neubrech, H. Giessen
Switchable mid-infrared plasmonic perfect absorber with multispectral thermal imaging capability
Advanced Materials 27, 4597 (2015)

[269] M. Xu, W. Zhang, R. Mazzarello, M. Wuttig
Disorder Control in Crystalline Ge₁Sb₂Te₄ using High Pressure
Advanced Science 2, 1500117 (2015)

[268] J.-Y. Raty, C. Bichara, W. Zhang, R. Mazzarello, C. Chao, J. Luckas, M. Wuttig
Aging mechanisms in amorphous phase change materials
Nature Communications 6, 7467 (2015)

[267] V. Deringer, R. Dronskowski, M. Wuttig
Microscopic Complexity in Phase-Change Materials and its Role for Applications

Advanced Functional Materials 25, 6343 (2015)

[266] H. Volker, P. Jost, M. Wuttig
Low-Temperature Transport in Crystalline $\text{Ge}_1\text{Sb}_2\text{Te}_4$
Advanced Functional Materials 25, 6390 (2015)

[265] P. Jost, H. Volker, A. Poitz, C. Poltorak, P. Zalden, T. Schäfer, F.R.L. Lange, R.M. Schmidt, B. Holländer, M.R. Wirtsohn, M. Wuttig
Disorder-induced localization in crystalline pseudo-binary $\text{GeTe-Sb}_2\text{Te}_3$ alloys between $\text{Ge}_3\text{Sb}_2\text{Te}_6$ and GeTe
Advanced Functional Materials 25, 6399 (2015)

[264] D. Shang, P. Li, T. Wang, E. Carria, J. Sun, B. Shen, T. Taubner, I. Valov, R. Waser, M. Wuttig
Understanding the conductive channel evolution in Na:WO_{3-x} -based planar devices
Nanoscale 7, 6023 (2015)

[263] M. Esser, V. Deringer, M. Wuttig, R. Dronskowski
Orbital mixing in solids as a descriptor for materials mapping
Solid State Communications 203, 31 (2015)

[262] W. Zhang, I. Ronneberger, P. Zalden, M. Xu, M. Salinga, M. Wuttig, R. Mazzarello
*How fragility makes phase-change data storage robust: insights from *ab initio* simulations*
Scientific Reports 4, 6529 (2014); DOI:10.1038/srep06529

[261] J. Luckas, A. Olk, P. Jost, H. Volker, J. Alvarez, A. Jaffre, P. Zalden, A. Piarristeguy, A. Pradel, C. Longeaud, and M. Wuttig
Impact of Maxwell rigidity transitions on resistance drift phenomena in $\text{Ge}_x\text{Te}_{1-x}$ glasses
Applied Physics Letters 105, 092108 (2014)

[260] A.-K. Michel, P. Zalden, D.N. Chigrin, M. Wuttig, A.M. Lindenberg, and T. Taubner
Reversible optical switching of infrared antenna resonances with ultrathin phase-change layers using femtosecond laser pulses
ACS Photonics 1, 833 (2014); DOI: 10.1021/ph500121d

[259] M. Shu, P. Zalden, F. Chen, B. Weems, I. Chatzakis, F. Xiong, R. Jeyasingh, M.C. Hoffmann, E. Pop, H. S. P. Wong, M. Wuttig, A. Lindenberg
Ultrafast terahertz-induced response of GeSbTe phase-change materials
Applied Physics Letters 104, 251907 (2014)

[258] K. S. Siegert, F. Lange, R. Sittner, H. Volker, C. Schlockermann, T. Siegrist, M. Wuttig
Impact of vacancy ordering on thermal transport in crystalline phase-change materials
Reports on Progress in Physics 78, 013001 (2015)

[257] S. Raoux, F. Xiong, M. Wuttig, E. Pop
Phase change materials and phase change memory
MRS Bulletin 39, 703 (2014)

[256] V. Deringer, W. Zhang, M. Lumeij, S. Maintz, M. Wuttig, R. Mazzarello, R. Dronskowski
Bonding Nature of Local Structural Motifs in Amorphous GeTe
Angewandte Chemie Int. Ed. 53, 10817 (2014)

[255] R.M. Schmidt, P. Ries, A. Pflug, M. Wuttig, T. Kubart
Increasing the carbon deposition rate using sputter yield amplification upon serial magnetron

co-sputtering

Surface & Coatings Technology 252, 74 (2014)

[254] M. Warzecha, D. Kohl, M. Wuttig, J. Huepkes

Ion beam assisted sputter deposition of ZnO for silicon thin-film solar cells

Journal of Physics D: Applied Physics 47, 105202 (2014)

[253] J. Luckas, D. Krebs, S. Grothe, J. Klomfass, R. Carius, C. Longeaud, and M. Wuttig
Defects in amorphous phase-change materials

Journal of Materials Research 28, 1139 (2013)

[252] P. Schulz, T. Schäfer, C. D. Zangmeister, C. Effertz, D. Meyer, D. Mokros, R. D. van Zee, R. Mazzarello, M. Wuttig

A new Route to Low Resistance Contacts for Performance-Enhanced Organic Electronic Devices

Advanced Materials Interfaces (2014), 1300130

[251] T. Leichtweiss, R. Henning, J. Koettgen, R. Schmidt, B. Hollaender, M. Martin, M. Wuttig, J. Janek

Amorphous and Highly Nonstoichiometric Titania (TiO_x) Thin Films close to Metal-like Conductivity

J. Mater. Chem. A 2 (2014), 6631

[250] P. Zalden, K. Siegert, S. Rols, H. Fischer, F. Schlich, T. Hu, M. Wuttig

Specific heat of GeTe_x(Sb₂Te₃)_{1-x} phase-change materials: The impact of disorder and anharmonicity

Chemistry of Materials 26, (2014) 2307

[249] P. Zalden, G. Aquilanti, C. Prestipino, O. Mathon, B. Andre, M. Wuttig, M.-V. Coulet,
Simultaneous calorimetric and quick-EXAFS measurements to study the crystallization process in phase change materials

Journal of Synchrotron Radiation 19, 806 (2012)

[248] Wen Pin Hsieh, P. Zalden, M. Wuttig, A.M. Lindenberg, W. Mao

High-pressure Raman spectroscopy of phase change materials

Applied Physics Letters 103, 191908 (2013)

[247] A. Michel, D.N. Chigrin, T.W. Maß, K. Schönauer, M. Salinga, M. Wuttig, T. Taubner
Using Low-Loss Phase-Change Materials for Mid-Infrared Antenna Resonance Tuning

Nano Letters 13, 3470 (2013); DOI: 10.1021/nl4006194

[246] M. Salinga, E. Carria, A. Kaldenbach, M. Börnhöfft, J. Benke, J. Mayer, M. Wuttig
Measurement of crystal growth velocity in a melt-quenched phase change material

Nature Communications 4: 2371 (2013); DOI: 10.1038/ncomms3371

[245] E.-R. Sittner, K.S. Siegert, P. Jost, C. Schlockermann, F.R.L. Lange, and M. Wuttig
(GeTe)_x-(Sb₂Te₃)_{1-x} phase-change films as potential thermoelectric materials

Physica Status Solidi A 210, 147 (2013)

[244] Da-Shan Shang, Ji-Rong Sun, Bao-Gen Shen and Matthias Wuttig

Resistive Switching in Oxides with inhomogeneous conductivity

Chin. Phys. B 22, 067202 (2013)

[243] W. Dewald, V. Sittinger, B. Szyszka, B. Stannowski, D. Köhl, P. Ries, M. Wuttig

Advanced Properties of Al-doped ZnO films with a seed layer approach for industrial thin film photovoltaic application

Thin Solid Films 534, 474 (2013)

- [242] J. Luckas, A. Piarristeguy, G. Bruns, P. Jost, S. Grothe, R.M. Schmidt, C. Longeaud, and M. Wuttig
Stoichiometry dependence of resistance drift phenomena in amorphous GeSnTe phase-change alloys
J. Appl. Phys. **113**, 023704 (2013)
- [241] G. Torricelli, P.J. van Zwol, O. Shpak, G. Palasantzas, V.B. Svetovoy, C. Binns, B.J. Kooi, P. Jost, M. Wuttig
Casimir Force Contrast Between Amorphous and Crystalline Phases of AlST
Advanced Functional Materials **22**, 3729 (2012)
- [240] C. Longeaud, J. Luckas, D. Krebs, R. Carius, J. Klomfass, and M. Wuttig
On the density of states of germanium telluride
J. Appl. Phys. **112**, 113714 (2012)
- [239] M. Wuttig and S. Raoux
The Science and Technology of Phase Change Materials
Z. Anorg. Allg. Chem. **638**, 2455 (2012)
- [238] N. Breznay, H. Volker, A. Palevski, R. Mazzarello, A. Kapitulnik, M. Wuttig
Weak antilocalization and disorder-enhanced electron interactions in crystalline GeSbTe
Physical Review B **86**, 205302 (2012)
- [237] S. Raoux, A. König, H.-Y. Cheng, D. Garbin, R.W. Cheek, J.L. Jordan-Sweet, M. Wuttig
Phase transitions in Ga-Sb phase change alloys
Physica Status Solidi B **249**, 1999 (2012)
- [236] M. Wuttig
Phase Change Materials: Chalcogenides with remarkable properties due to an unconventional bonding mechanism
Physica Status Solidi B **249**, 1843 (2012)
- [235] W. Zhang, A. Thiess, P. Zalden, R. Zeller, P.H. Dederichs, J.-Y. Raty, M. Wuttig, S. Blügel, R. Mazzarello
Role of vacancies in metal-insulator transitions of crystalline phase change materials
Nature Materials **11**, 952 (2012)
- [234] S. Buller, C. Koch, W. Bensch, P. Zalden, R. Sittner, S. Kremers, M. Wuttig, U. Schürmann, L. Kienle, T. Leichtweiss, J. Janek, B. Schönborn
Influence of partial substitution of Te by Se and Ge by Sn on the properties of the Blu-ray phase change material $\text{Ge}_8\text{Sb}_2\text{Te}_{11}$
Chemistry of Materials **24**, 3582 (2012)
- [233] R. Sittner, K.S. Siegert, P. Jost, C. Schlockermann, F.R.L. Lange, M. Wuttig
 $(\text{GeTe})_x - (\text{Sb}_2\text{Te}_3)_{1-x}$ phase change thin films as potential thermoelectric materials
Physica Status Solidi A **210**, 147 (2013)
- [232] T. Kubart, R. Schmidt, M. Austgen, T. Nyberg, A. Pflug, M. Siemers, M. Wuttig, S. Berg
Modelling of sputtering yield amplification in serial reactive magnetron co-sputtering
Surface & Coatings Technology **206**, 5055 (2012)
- [231] M. Anbarasu, M. Wimmer, G. Bruns, M. Salinga, and M. Wuttig
Nanosecond threshold switching of GeTe_6 cells and their potential as selector devices

Applied Physics Letters 100, 143505 (2012)

[230] M. Wuttig, M. Salinga
Phase Change Materials: Fast Transformers
Nature Materials 11, 270 (2012)

[229] J.-Y. Raty, C. Bichara, R. Mazzarello, P. Rausch, P. Zalden, M. Wuttig
Comment to „New Structural Picture of the Ge₂Sb₂Te₅ Phase-Change Alloy
Physical Review Letters 108, 239601 (2012)

[228] D. Krebs, R. M. Schmidt, J. Klomfaß, J. Luckas, G. Bruns, C. Schlockermann, M. Salinga, R. Carius, M. Wuttig
Impact of DoS changes on resistance drift and threshold switching in amorphous phase change materials
Journal of Non-Crystalline Solids 358, 2412 (2012)

[227] S. Raoux, D. Ielmini, M. Wuttig, I. Karpov
Phase Change Materials
MRS Bulletin 37, 118 (2012)

[226] L. Ding, P. Schulz, A. Farahzadi, K.V. Shportko, M. Wuttig
Investigation of intermolecular interactions in perylene films on Au(111) by IR spectroscopy
J. Chem. Phys. 136, 054503 (2012)

[225] C. Effertz, S. Lahme, P. Schulz, I. Segger, M. Wuttig
Design of novel dielectric surface modifications for perylene thin-film transistor
Advanced Functional Materials 22, 415 (2012)

[224] T. Siegrist, P. Merkelbach, and M. Wuttig
Phase Change Materials: Towards a Universal Data Storage Device
Annu. Rev. Condens. Matter Phys. 3:11.1-11.23 (2012)

[223] J. Tomforde, W. Bensch, L. Kienle, V. Duppel, P. Merkelbach and M. Wuttig
Thin Films of GeSbTe-Based Phase Change Materials: Microstructure and in Situ Transformation
Chemistry of Materials 23, 3871 (2011)

[222] M. Anbarasu, M. Wuttig
Understanding the structure and properties of phase change materials for data storage
J. Indian Inst. of Sci. 91, 259 (2011)

[221] J. Luckas, S. Kremers, D. Krebs, M. Salinga, M. Wuttig, C. Longeaud
The influence of a temperature dependent bandgap on the energy scale of modulated photocurrent experiments
J. Appl. Phys. 110, 013719 (2011)

[220] M. Austgen, D. Köhl, P. Zalden, T. Kubart, T. Nyberg, A. Pflug, M. Siemers, S. Berg, M. Wuttig
Sputter yield amplification by Tungsten doping of Al₂O₃ employing reactive serial co-sputtering: process characteristics and resulting film properties
J. Phys. D: Appl. Phys. 44, 345501 (2011)

[219] C. Hermes, M. Wimmer, S. Menzel, K. Fleck, G. Bruns, M. Salinga, U. Böttger, R. Bruchhaus, T. Schmitz-Kampen, M. Wuttig, R. Waser

Analysis of transient currents during ultrafast switching of TiO₂ Nanocrossbar Devices
IEEE Electron Device Letters 32, 1116 (2011)

[218] T. Matsunaga, N. Yamada, R. Kojima, S. Shamoto, M. Sato, H. Tanida, T. Uruga, S. Kohara, M. Takata, P. Zalden, G. Bruns, I. Sergueev, H.C. Wille R. Hermann, M. Wuttig
Phase-Change Materials: Vibrational softening upon crystallization and its impact on thermal properties
Advanced Functional Materials 21, 2232 (2011)

[217] M. Salinga and M. Wuttig
Phase-Change Memories on a Diet
Science 332, 543 (2011)

[216] D. Lencer, M. Salinga and M. Wuttig
Design Rules for Phase-Change Materials in Data Storage Applications
Advanced Materials 23, 2030 (2011)

[215] J. Boltz, D. Köhl, M. Wuttig
Low temperature sputter deposition of SnOx:Sb films for transparent conducting oxide applications
Surface & Coatings Technology 205, 2455 (2010)

[214] T. Siegrist, P. Jost, H. Volker, M. Woda, P. Merkelbach, C. Schlockermann, M. Wuttig
Disorder-induced localization in crystalline phase-change materials
Nature Materials 10, 202 (2011)

[213] P. Schulz, C.D. Zangmeister, Y. Zhao, P.R. Frail, S.R. Saudari, C.A. Gonzalez, C.R. Kagan, M. Wuttig und R.D. van Zee
Comparison of the Energy-Level Alignment of Thiolate- and Carbothiolate-bound self-assembled Monolayers on Gold
J. Phys. Chem. C 114, 20843 (2010)

[212] J. Okumu, D. Köhl, A. Sprafke, G. von Plessen, M. Wuttig
Formation mechanism of noble metal nanoparticles in reactively sputtered TiO₂ films
Journal of Applied Physics 108, 063529 (2010)

[211] A. Amin, D. Köhl, M. Wuttig
The role of energetic ion bombardment during growth of TiO₂ thin films by reactive sputtering
J. Physics D: Applied Physics 43, 405303 (2010)

[210] R. Waser, R. Dittmann, M. Salinga, M. Wuttig
Function by defects at the atomic scale - New concepts for non-volatile memories
Solid-State Electronics 54, 830 (2010)

[209] T. Kubart, T. Nyberg, A. Pflug, M. Siemers, M. Austgen, D. Köhl, M. Wuttig, S. Berg
Modelling of sputtering yield amplification effect in reactive deposition of oxides

Surface & Coatings Technology 204, 3882 (2010)

[208] G. Torricelli, P.J. van Zwol, O. Shpak, C. Binns, G. Palasantzas, B. Kooi, V.B. Svetovoy, M. Wuttig

Switching Casimir forces with phase-change materials

Physical Review A, 82, 010101 (2010)

[207] A. Farahzadi, P. Niyamakom, M. Beigmohamadi, N. Meyer, D. Keiper, M. Heuken, F. Ghasemi, M.R. Rahimi Tabar, T. Michely, M. Wuttig

Stochastic analysis on temperature-dependent roughening of amorphous organic films

EPL 90, 10008 (2010)

[206] A. Farahzadi, M. Beigmohamadi, P. Niyamakom, S. Kremers, N. Meyer, M. Heuken, M. Wuttig

Characterization of amorphous organic thin films, determination of precise model for spectroscopic ellipsometry measurements

Appl. Surface Science, 256, 6612 (2010)

[205] P. Zalden, C. Bichara, J. van Eijk, C. Braun, W. Bensch, M. Wuttig:

Atomic structure of amorphous and crystallized $\text{Ge}_{15}\text{Sb}_{85}$

Journal of Applied Physics 107, 104312 (2010)

[204] D. Köhl, M. Luysberg, M. Wuttig:

Structural improvement of zinc oxide films produced by ion beam assisted reactive sputtering

J. Phys. D: Applied Physics 43, 205301 (2010)

[203] R. Waser, R. Dittmann, M. Salinga, M. Wuttig

The role of defects in resistively switching chalcogenides

International Journal of Materials Research, 101, 182 (2010)

[202] J. Luckas, D. Krebs, M. Salinga, M. Wuttig, C. Longeaud

Investigation of defect states in the amorphous phase of the PC alloys GeTe and $\text{Ge}_2\text{Sb}_2\text{Te}_5$

Phys. Stat. Sol. C 7, 852 (2010)

[201] W. Welnic, M. Wuttig, S. Botti, L. Reining:

Local atomic order and optical properties in amorphous and laser-crystallized GeTe

Comptes Rendus Physique 10, 514 (2009)

[200] D. Krebs, S. Raoux, C. Rettner, G. Burr, R. Shelby, M. Salinga, C. Jefferson, M. Wuttig:

Characterisation of Phase Change Memory Materials using Phase Change Bridge Devices

Journal of Applied Physics 106, 054308 (2009)

[199] D. Köhl, M. Luysberg and M. Wuttig:

Highly textured zinc oxide films by room temperature ion beam assisted deposition

Phys. Status Solidi RRL 3, 236 (2009)

[198] M. Wuttig:

Phase change materials: The Importance of resonance bonding
Phys. Status Solidi B 246, 1820 (2009)

[197] D. Lencer, M. Wuttig:
Phase-Change Materials for non-volatile data storage
in: Nanostructured materials for advanced technological applications
NATO Series B - Physics and Biophysics, 413 (2009)

[196] D. Subramaniam, C. Pauly, M. Liebmann, M. Woda, P. Rausch, P. Merkelbach, M. Wuttig, M. Morgenstern:
Scanning tunneling microscopy and spectroscopy of the phase change alloy $\text{Ge}_1\text{Sb}_2\text{Te}_4$
Applied Physics Letters 95, 103110 (2009)

[195] D. Krebs, S. Raoux, C. Rettner, G. Burr, M. Salinga, M. Wuttig:
Threshold Field of Phase Change Memory Materials measured using Phase Change Bridge Devices
Applied Physics Letters 95, 082101 (2009)

[194] G. Bruns, P. Merkelbach, C. Schlockermann, M. Salinga, M. Wuttig, T.D. Happ, J.B. Philipp, M. Kund:
Nanosecond switching in GeTe phase change memory cells
Applied Physics Letters 95, 043108 (2009)

[193] K. Shportko, Y. Pasechnik, M. Wuttig, R. Rueckamp, V.M. Trukhan, T.V. Haliakovich:
Plasmon-phonon contribution in the permittivity of ZnP_2 single crystals in FIR at low temperatures
Vibrational Spectroscopy 50, 209 (2009)

[192] J. Alami, K. Sarakinos, F. Uslu, C. Klever, J. Dukwen, M. Wuttig:
On the phase formation of titanium oxide films grown by reactive high power pulsed magnetron sputtering
J. Phys. D: Applied Physics 42, 115204 (2009)

[191] J. Alami, K. Sarakinos, F. Uslu, M. Wuttig:
On the relationship between the peak target current and the morphology of chromium nitride thin films deposited by reactive high power pulsed magnetron sputtering
J. Phys. D: Applied Physics 42, 015304 (2009)

[190] D. Severin, O. Kappertz, T. Nyberg, S. Berg, A. Pflug, and M. Wuttig:
Increase of the deposition rate in reactive sputtering of metal oxides using a ceramic nitride target
Journal of Applied Physics 105, 093302 (2009)

[189] J. Tomforde, S. Buller, M. Ried, W. Bensch, D. Wamwangi, M. Heidelmann, M. Wuttig:
The influence of Se doping upon the phase change characteristics of GeSb_2Te_4
Solid State Sciences 11, 683 (2009)

- [188] K. Sarakinos, J. Alami, J. Dukwen, J. Woerdenweber, M. Wuttig:
A semi-quantitative model for the deposition rate in non-reactive high power pulsed magnetron sputtering
J. Phys. D: Applied Physics **41**, 215301 (2008)
- [187] M. Micoulaut, W. Welnic, M. Wuttig:
Structure of the liquid and the crystal of the phase change material SnSe₂: First-principles molecular dynamics
Physical Review B **78**, 224209 (2008)
- [186] D. Lencer, M. Salinga, B. Grabowski, T. Hickel, J. Neugebauer, M. Wuttig:
A map for phase change materials
Nature Materials **7**, 972 (2008)
- [185] C. Steimer, M. Coulet, W. Welnic, H. Dieker, R. Detemple, C. Bichara, B. Beuneu, J.P. Gaspard, M. Wuttig:
Characteristic Ordering in Liquid Phase Change Materials
Advanced Materials **20**, 4535 (2008)
- [184] M. Beigmohamadi, P. Niyamakom, A. Farazadi, C. Effertz, S. Kremers, D. Brueggemann, M. Wuttig:
Structure and morphology of perylene films grown on different substrates
Journal of Applied Physics **104**, 013505 (2008)
- [183] C. Effertz, M. Beigmohamadi, P. Niyamakom, P. Schulz, M. Wuttig:
Influence of dielectric surface modification on growth, structure and transport properties of perylene films
Physica Status Solidi B **245**, 782 (2008)
- [182] K. Shportko, S. Kremers, M. Woda, D. Lencer, J. Robertson, M. Wuttig:
Resonant bonding in crystalline phase change materials
Nature Materials **7**, 653 (2008)
- [181] M. Berginski, J. Hüpkes, A. Gordijn, W. Reetz, T. Wätjen, B. Rech, M. Wuttig:
Experimental studies and limitations of the light trapping and optical losses in microcrystalline silicon solar cells
Solar Energy Materials and Solar Cells **92**, 1037 (2008)
- [180] K. Sarakinos, J. Alami, C. Klever, M. Wuttig:
Process stabilization and enhancement of deposition rate during reactive high power pulsed magnetron sputtering of zirconium oxide
Surface Coatings and Technology **202**, 5033 (2008)
- [179] W. Welnic, M. Wuttig:
Reversible switching in phase change materials
Materials Today **11**, Issue 6, 20 (2008)

- [178] M. Berginski, J. Hüpkes, W. Reetz, B. Rech, M. Wuttig:
Recent development of surface-textured ZnO:Al films prepared by sputtering for thin-film solar cell application
Thin Solid Films 516, 5836 (2008)
- [177] K. Chung, D. Wamwangi, M. Woda, M. Wuttig and W. Bensch:
Investigation of SnSe, SnSe₂ and Sn₂Se₃ alloys for phase change memory applications
J. Appl. Phys. 103, 083523 (2008)
- [176] D. Severin, K. Sarakinos, O. Kappertz, A. Pflug, and M. Wuttig:
Tailoring of structure formation and phase composition in reactively sputtered zirconium oxide films using nitrogen as an additional reactive gas
J. Appl. Phys. 103, 083306 (2008)
- [175] A. Klein, C. Steimer, H. Dieker, B. Späth, P. Fons, A. Kolobov, and M. Wuttig:
Changes in electronic structure and chemical bonding upon crystallization of the phase change material Ge₁Sb₂Te₄
Physical Review Letters 100, 016402 (2008)
- [174] M. Beigmohamadi, P. Niyamakom, A. Farahzadi, S. Kremers, T. Michely and M. Wuttig:
Evolution of dislocations in perylene thin films with thickness and deposition rate
Physica Status Solidi Rapid Research Letters 2, 1 (2008)
- [173] K. Sarakinos, J. Wördenweber, F. Uslu, P. Schulz, J. Alami, M. Wuttig:
The effect of the microstructure and the surface topography on the electrical properties of thin Ag films deposited by high power pulsed magnetron sputtering
Surface & Coatings Technology 202, 2323 (2007)
- [172] K. Wang, C. Steimer, M. Wuttig:
Phase change properties of ternary AgSbSe₂
J. of Optoelectronics and Advanced Materials 9, 2008 (2007)
- [171] W. Welnic, J.A. Kalb, D. Wamwangi, C. Steimer, M. Wuttig:
Phase change materials: From structures to kinetics
J. Mater. Res. Vol. 22, 2368 (2007)
- [170] K. Sarakinos, J. Alami, P.M. Karimi, D. Severin, M. Wuttig:
The effect of backscattered energetic atoms in film growth on the stress generation and the surface morphology of reactively sputtered vanadium nitride films
Thin Solid Films 516, 4568 (2008)
- [169] K. Sarakinos, J. Alami, C. Klever, M. Wuttig:
Growth of TiO_x films by high power pulsed magnetron sputtering from a TiO_{1.8} target
Rev. Adv. Mater. Sci. 15, 44 (2007)
- [168] T. Blachowicz, M. G. Beghi, G. Güntherodt, B. Beschoten, H. Dieker and M. Wuttig:
Crystalline phases in the Ge₁Sb₂Te₄ system: Phase transitions and elastic properties

J. Appl. Phys. 102, 093519 (2007)

[167] M. Wuttig and N. Yamada:
Phase change materials for rewriteable data storage
Nature Materials 6, 824 (2007)

[166] W. Welnic, S. Botti, L. Reining, M. Wuttig:
Origin of the optical contrast in phase change materials
Physical Review Letters 98, 236403 (2007)

[165] M. Berginski, J. Hüpkens, M. Schulte, G. Schöpe, H. Stiebig, B. Rech, M. Wuttig
The effect of front ZnO:Al surface texture and optical transparency on efficient light trapping in silicon thin-film solar cells
J. Appl. Phys. 101, 074903 (2007)

[164] G. Beck, H. Fischer, E. Mutoro, V. Srot, K. Petrikowski, E. Tchernychova, M. Wuttig, M. Rühle, B. Luerßen, J. Janek:
Epitaxial Pt(111) thin film electrodes on YSZ(111) and YSZ(100): Preparation and characterization
Solid State Ionics 178, 327 (2007)

[163] K. Sarakinos, J. Alami, M. Wuttig:
Process characteristics and film properties upon growth of TiOx films by high power pulsed magnetron sputtering
J. Phys. D: Appl. Phys. 40, 2108 (2007)

[162] M. Wuttig, C. Steimer:
Phase change materials: From material science to novel storage devices
Appl. Phys. A 87, 411 (2007)

[161] J. Kalb, M. Wuttig, F. Spaepen:
Calorimetric measurements of structural relaxation and glass transition temperatures in sputtered films of amorphous Te alloys used for phase change recording
J. Mater. Res. Vol. 22, 748 (2007)

[160] D. Severin, O. Kappertz, T. Nyberg, S. Berg, M. Wuttig:
The effect of target aging on the structure formation of zinc oxide during reactive sputtering
Thin Solid Films 515, 3554 (2007)

[159] K. Sarakinos, J. Alami, P.M. Karimi, D. Severin, M. Wuttig:
The role of backscattered energetic atoms in film growth in reactive magnetron sputtering of chromium nitride
J. Phys. D: Appl. Phys. 40, 778 (2007)

[158] K. Wang, C. Steimer, D. Wamwangi, S. Ziegler, M. Wuttig, J. Tomforde, W. Bensch:
Influence of doping upon the phase change characteristics of Ge₂Sb₂Te₅
Microsystems Technologies 13, 203 (2007)

- [157] M. Wuttig, D. Lüsebrink, D. Wamwangi, W. Welnic, M. Gillessen, R. Dronskowski:
The role of vacancies and local distortions to design phase change materials
Nature Materials **6**, 122 (2007)
- [156] M. J. Kang, T.J. Park, D. Wamwangi, K. Wang, C. Steimer, S. Y. Choi, M. Wuttig:
Electrical properties and crystallization behavior of Sb_xSe_{100-x} thin films
Microsystems Technologies **13**, 153 (2007)
- [155] C. Salinga, O. Kappertz, M. Wuttig:
Reactive direct current magnetron sputtering of tungsten oxide: A correlation between film properties and deposition pressure
Thin Solid Films **515**, 2760 (2006)
- [154] J. Okumu, F. Körfer, C. Salinga, T.P. Pedersen, M. Wuttig:
Gasochromic switching of reactively sputtered molybdenum films: A correlation between film properties and deposition pressure
Thin Solid Films **515**, 1327 (2006)
- [153] C. Steimer, W. Welnic, J. Kalb, M. Wuttig:
Towards an atomistic understanding of phase change materials
Journal of Optoelectronics and Advanced Materials **8**, 2044 (2006)
- [152] J. Hüpkes, B. Rech, O. Kluth, T. Repmann, B. Zwaygardt, J. Müller, R. Drese, M. Wuttig:
Surface-textured MR-sputtered ZnO films for microcrystalline silicon-based TF solar cells
Solar Energy Materials and Solar Cells, **90**, 3054 (2006)
- [151] J. Alami, K. Sarakinos, G. Mark, M. Wuttig:
On the deposition rate in a high power pulsed magnetron sputtering discharge
Applied Physics Letters **89**, 154104 (2006)
- [150] Y. Yang, C.-T. Li, S.M. Sadeghipour, H. Dieker, M. Wuttig, M. Asheghi:
Thermal characterization of dielectric and phase change materials for the optical recording applications
J. Appl. Physics **100**, 024102 (2006)
- [149] S. Venkataraj, H. Kittur, R. Drese, M. Wuttig:
Multi-technique characterization of tantalum oxinitride films prepared by reactive DC magnetron sputtering
Thin Solid Films **514**, 1 (2006)
- [148] R. Drese, M. Wuttig:
In situ stress measurements in zirconium and zirconium oxide films prepared by direct-current sputtering
J. Appl. Physics **99**, 123517 (2006)

- [147] D. Severin, O. Kappertz, T. Kubart, T. Nyberg, S. Berg, A. Pflug, M. Simers, M. Wuttig:
Process stabilization and increase of the deposition rate in reactive sputtering of metal oxides and oxynitrides
Applied Physics Letters 88, 161504 (2006)
- [146] S. Ziegler and M. Wuttig:
Nucleation of AgInSbTe films employed in phase-change media
J. Appl. Physics 99, 064907 (2006)
- [145] J. Hüpkes, B. Rech, S. Calnan, O. Kluth, U. Zastrow, H. Siekmann, M. Wuttig:
Material study on reactively sputtered zinc oxide for thin-film silicon solar cells
Thin Solid Films 502, 286 (2006)
- [144] S. Venkataraj, D. Severin, S. H. Mohamed, J. Ngaruiya, O. Kappertz, M. Wuttig:
Towards understanding the superior properties of transition metal oxynitrides prepared by reactive DC magnetron sputtering
Thin Solid Films 502, 228 (2006)
- [143] S. Venkataraj, D. Severin, R. Drese, F. Koerfer, M. Wuttig:
Structural, optical and mechanical properties of aluminium nitride films prepared by reactive DC magnetron sputtering
Thin Solid Films 502, 235 (2006)
- [142] X. Liu and M. Wuttig
Inherent features in the growth of perylene on an oil substrate
Physical Rev. B 73, 033405 (2006)
- [141] C. Dahmen, A. N. Sprafke, H. Dieker, M. Wuttig, and G. von Plessen
Optical and structural changes of silver nanoparticles during photochromic transformation
Applied Physics Letters 88, 011923 (2006)
- [140] R. Drese, M. Wuttig:
Stress evolution during growth in direct-current sputtered zinc oxide films at various flows
J. Appl. Physics 98, 73514 (2005)
- [139] Y. Yang, C.-T. Li, S. M. Sadeghipour, M. Asheghi, H. Dieker, M. Wuttig:
Thermal characterization of dielectric and phase change materials for the optical recording applications
ASME Proceedings 2005
- [138] S.-M. Yoon, N.-Y. Lee, S.-O. Ryu, K.-J. Choi, Y.-S. Park, S.-Y. Lee, B.-G. Yu, M.-J. Kang, S.-Y. Choi, M. Wuttig:
Sb-Se based Phase-Change Memory Device with Lower Power and Higher Speed Operations
IEEE Electron Device Letters 27, 445 (2006)
- [137] K. Wang, C. Steimer, R. Detemple, D. Wamwangi, M. Wuttig

Assessment of Se based phase change alloys as candidate for non-volatile electronic memory applications

Applied Physics A 81, 1601 (2005)

[136] W. Welnic, A. Pamungkas, R. Detemple, C. Steimer, S. Blügel, M. Wuttig:
Unravelling the interplay of local structure and physical properties in phase-change materials
Nature Materials 5, 56 (2006)

[135] J. Kalb, F. Spaepen, M. Wuttig:
Kinetics of crystal nucleation in undercooled droplets of Sb and Te based alloys used for phase change recording
J. Appl. Physics 98, 54910 (2005)

[134] J. Kalb, C.-Y. Wen, F. Spaepen, H. Dieker, M. Wuttig:
Crystal morphology and nucleation in thin films of amorphous Te alloys used for optical data storage
J. Appl. Physics 98, 54902 (2005)

[133] M. J. Kang, S. Y. Choi, D. Wamwangi, K. Wang, C. Steimer, M. Wuttig:
Structural transformation of Sb_xSe_{100-x} thin films for phase change nonvolatile memory applications
J. Appl. Physics 98, 14904 (2005)

[132] O. Kappertz, R. Drese, J. Ngaruiya, M. Wuttig:
Reactive sputter deposition of zinc oxide: Employing resputtering effects
Thin Solid Films 484, 64 (2005)

[131] K. Wang, C. Steimer, D. Wamwangi, S. Ziegler, M. Wuttig:
Influence of indium doping on $Ge_2Sb_2Te_5$ thin films for phase change optical storage
Applied Physics A 80, 1611 (2005)

[130] H. Dieker, M. Wuttig:
Influence of deposition parameters on the properties of sputtered $Ge_2Sb_2Te_5$
Thin Solid Films 478, 248 (2005)

[129] J. Okumu, C. Dahmen, A.N. Sprafke, M. Luysberg, G. von Plessen, M. Wuttig:
Photochromic silver nanoparticles fabricated by sputter deposition
J. Applied Physics 97, 94305 (2005)

[128] M. Wuttig:
Phase change materials: Towards a universal memory?
Nature Materials 4, 265 (2005)

[127] W. Kalb, P. Lang, M. Mottaghi, H. Aubin, G. Horowitz, T. Michely, M. Wuttig:
Structure-performance relationship in pentacene/ Al_2O_3 thin-film transistors
Synthetic Metals 146, 279 (2004)

- [126] K. Wang, D. Wamwangi, S. Ziegler, C. Steimer, M. Wuttig:
Influence of Bi doping upon the phase change characteristics of $\text{Ge}_2\text{Sb}_2\text{Te}_5$
J. Applied Physics **96**, 5557 (2004)
- [125] M. Delheusy, J.Y. Raty, R. Detemple, W. Welnic, M. Wuttig, J.-P. Gaspard:
Structure of liquid Te-based alloys used in rewritable DVDs
Physica B **350**, e1055 (2004)
- [124] W.K. Njoroge, H. Dieker, M. Wuttig:
Influence of dielectric capping layers on the crystallization kinetics of $\text{Ag}_5\text{In}_6\text{Sb}_{59}\text{Te}_{30}$ films
J. Applied Physics **96**, 2624 (2004)
- [123] K. Wang, D. Wamwangi, S. Ziegler, C. Steimer, M.J. Kang, S.Y. Choi, M. Wuttig:
Influence of Sn doping upon the phase change characteristics of $\text{Ge}_2\text{Sb}_2\text{Te}_5$
Physica Status Solidi **201**, 3087 (2004)
- [122] S. H. Mohamed, O. Kappertz, T. Niemeier, R. Drese, M. Wakkad, M. Wuttig:
Effect of heat treatment on structural, optical and mechanical properties of sputtered TiO_xN_y films
Thin Solid Films **468**, 48 (2004)
- [121] X. Liu, V. Kaiser, M. Wuttig und T. Michely:
Unidirectional anisotropies in perylene growth on a liquid surface
Journal of Crystal Growth **269**, 542 (2004)
- [120] X. R. Zhang und M. Wuttig:
Crystallization kinetics of amorphous $\text{In}_{44}\text{Sb}_{20}\text{Te}_{36}$ phase change optical recording films on a nanosecond scale
Chinese Physics Letters **21**, 1096 (2004)
- [119] T.L. Pedersen, C. Liesch, C. Salinga, T. Eleftheriades, M. Wuttig:
Hydrogen induced changes of mechanical stress and optical transmission in thin Pd films
Thin Solid Films **458**, 299 (2004)
- [118] J. M. Ngaruiya, O. Kappertz, S.H. Mohamed, M. Wuttig:
Structure formation upon reactive DC sputtering of transition metal oxides
Applied Physics Letters **85**, 748 (2004)
- [117] J. Kalb, F. Spaepen, M. Wuttig:
Atomic force microscopy measurements of crystal nucleation and growth rates in thin films of amorphous Te alloys
Applied Physics Letters **84**, 5240 (2004)
- [116] S. Venkataraj, O. Kappertz, Ch. Liesch, R. Detemple, R. Jayavel, M. Wuttig:
Thermal stability of sputtered zirconium oxide films
Vacuum **75**, 7 (2004)

- [115] J. Okumu, F. Koerfer, C. Salinga, M. Wuttig:
In-situ measurements of thickness changes and mechanical stress upon gasochromic switching of thin MoO_x films
J. Applied Physics 95, 7632 (2004)
- [114] D. Wamwangi, X. Zhang, R. Detemple, H.-W. Wöltgens, M. Wuttig:
Identifying Au-based Te alloys for optical data storage
J. Applied Physics 95, 7567 (2004)
- [113] C. Agashe, O. Kluth, J. Hüpkes, U. Zastrow, B. Rech, M. Wuttig:
Efforts to improve carrier mobility in RF sputtered ZnO:Al films
J. Applied Physics 95, 1911 (2004)
- [112] J. Kalb, F. Spaepen, M. Wuttig:
Kinetics of Crystal Nucleation in thin films of amorphous Te alloys measured by AFM
Mat. Res. Soc. Symposium Proceedings 803, HH 3.8 (2004)
- [111] Mengbo Luo and M. Wuttig:
Dependence of crystal structure of Te based phase change materials on number of valence electrons
Advanced Materials 16, 439 (2004)
- [110] J. Siegel, A. Schropp, J. Solis, C.N. Afonso, M. Wuttig:
Picosecond laser pulse induced rewritable phase change optical recording in Ge₂Sb₂Te₅ films
Applied Physics Letters 84, 2250 (2004)
- [109] J. M. Ngaruiya, O. Kappertz, C. Liesch, P. Müller, R. Dronskowski, M. Wuttig:
Composition and formation mechanism of zirconium oxynitride films produced by reactive magnetron sputtering
Physica Status Solidi (a) 201, 967 (2004)
- [108] S. H. Mohamed, O. Kappertz, J. Ngaruiya, T. Niemeier, R. Drese, R. Detemple, M. Wakkad, M. Wuttig:
Influence of nitrogen content of direct current sputtered TiO_xN_y films
Physica Status Solidi (a) 201, 90 (2004)
- [107] J.A. Kalb, F. Spaepen, T. Pedersen, M. Wuttig:
Viscosity and elastic constants of amorphous Te alloys used for optical data storage
J. Applied Physics 94, 4908 (2003)
- [106] R. Detemple, D. Wamwangi, M. Wuttig, G. Bihlmayer:
Identification of Te alloys with suitable phase change characteristics
Applied Physics Letters 83, 2572 (2003)
- [105] S. H. Mohamed, O. Kappertz, T.P. Pedersen, R. Drese, M. Wuttig:
Properties of TiO_x coatings prepared by dc magnetron sputtering

Physica Status Solidi 198, 224 (2003)

[104] T.P. Pedersen, C. Salinga, H. Weis, M. Wuttig:
Mechanical stresses upon hydrogen induced optical switching of thin films
Journal of Applied Physics 93, 6034 (2003)

[103] X. Liu, S. H. Mohamed, J. M. Ngaruiya, M. Wuttig and T. Michely:
Modifying the growth of organic thin films by a self-assembled monolayer
Journal of Applied Physics 93, 4852 (2003)

[102] J. M. Ngaruiya, S. Venkataraj, R. Drese, O. Kappertz, T.P. Pedersen, M. Wuttig:
Preparation and characterization of tantalum oxide films produced by Reactive DC Magnetron sputtering
Physica Status Solidi 198, 99 (2003)

[101] S. H. Mohamed, O. Kappertz, J. M. Ngaruiya, T.P. Pedersen, R. Drese, M. Wuttig:
Correlation between structure, stress and optical properties in DC sputtered molybdenum oxide films
Thin Solid Films 429, 135 (2003)

[100] J.A. Kalb, F. Spaepen, M. Wuttig:
Calorimetric measurements of phase transformations in thin films of amorphous Te alloys used for optical data storage
J. Applied Physics 93, 2389 (2003)

[99] D. Kurapov, D. Neuschütz, R. Cremer, T. Pedersen, M. Wuttig, D. Dietrich, G. Marx, J.M. Schneider:
Synthesis and mechanical properties of BCN coatings deposited by PECVD
Vacuum 68, 335 (2002)

[98] S. Venkataraj, O. Kappertz, H J. Weis, R. Drese, R. Jayavel, M. Wuttig:
Structural and optical properties of thin zirconium oxide films prepared by reactive direct current magnetron sputtering
J. Applied Physics 92, 3599 (2002)

[97] S. Venkataraj, O. Kappertz, R. Jayavel, M. Wuttig:
Growth and characterization of zirconium oxynitride films prepared by reactive direct current magnetron sputtering
J. Applied Physics 92, 2461 (2002)

[96] S. Venkataraj, R. Drese, Ch.Liesch, O. Kappertz, R. Jayavel, M. Wuttig:
Thermal stability of lead oxide films prepared by reactive DC magnetron sputtering
Physica status solidi (a) 194, 192 (2002)

[95] O. Kappertz, R. Drese, M. Wuttig:
Correlation between structure, stress and depositions parameters in DC-sputtered ZnO films
J. Vac. Sci. Technol. A20, 2084 (2002)

- [94] C. Salinga, H. Weis, M. Wuttig:
Gasochromic switching of Tungsten Oxide Films: a correlation between film properties and coloration kinetics
Thin Solid Films 414, 275 (2002)
- [93] M. Wuttig, R. Detemple, I. Friedrich, W.K. Njoroge, I. Thomas, V. Weidenhof, H.-W. Wöltgens, S. Ziegler:
The quest for fast phase change materials
J. Mag. Mat. 249, 492 (2002)
- [92] D. Wamwangi, W. Njoroge, M. Wuttig:
Crystallization kinetics of $\text{Ge}_4\text{Sb}_1\text{Te}_5$ films
Thin Solid Films 408, 310 (2002)
- [91] G.-X. Ye, M. Wuttig, T. Michely:
Diffusion studies in a non-equilibrium system with repulsive interactions
Phys. Rev. B 65, 205409 (2002)
- [90] S. Venkataraj, R. Drese, Ch. Liesch, O. Kappertz, R. Jayavel, M. Wuttig:
Temperature stability of sputtered niobium oxide films
J. Applied Physics 91, 4863 (2002)
- [89] X. Liu, B. Schirmer und M. Wuttig:
Observation of an exchange anisotropy in Fe/Ni bilayers on Cu(100)
Phys. Rev. B 65, 224413 (2002)
- [88] W. Njoroge, H.-W. Wöltgens, M. Wuttig:
Density changes upon crystallization of $\text{Ge}_2\text{Sb}_{2.04}\text{Te}_{4.74}$ films
J. Vac. Sci. Technol. A 20, 230 (2002)
- [87] B. Yang, J. Ritter, J. Mayer, M. Wuttig, T. Michely:
Fragmentation, 2D-bubbles and coarsening: structure and transformations of nanocrystal aggregate networks on a liquid surface
Surface Science 497, 100 (2002)
- [86] S. Venkataraj, R. Drese, O. Kappertz, R. Jayavel, M. Wuttig:
Characterization of niobium oxide films prepared by reactive DC magnetron sputtering
Physica status solidi (a) 188, 1047 (2001)
- [85] W. Njoroge, M. Wuttig:
Crystallization kinetics of sputter-deposited amorphous AgInSbTe films
J. Applied Phys. 90, 3816 (2001)
- [84] S. Venkataraj, J. Geurts, H. Weis, O. Kappertz, W. Njoroge, R. Jayavel, M. Wuttig:
Structural and optical properties of thin lead oxide films produced by reactive DC magnetron sputtering

J. Vac. Sci. Technol. A 19, 2870 (2001)

[83] T. Pedersen, J. Kalb, W. Njoroge, D. Wamwangi, M. Wuttig, F. Spaepen:
Mechanical stresses upon crystallization in phase change materials
Applied Physics Letters 79, 3597 (2001)

[82] R. Detemple, I. Friedrich, W.K. Njoroge, I. Thomas, V. Weidenhof, H.-W. Wöltgens, S. Ziegler und M. Wuttig:
Microscopic studies of fast transformations in GeSbTe films
MRS Symposium Proceedings Vol. 674, V1.8 (2001)

[81] H.-W. Wöltgens, R. Detemple, I. Friedrich, W.K. Njoroge, I. Thomas, V. Weidenhof, S. Ziegler und M. Wuttig:
Exploring the limits of fast phase change materials
MRS Symposium Proceedings Vol. 674, V1.3 (2001)

[80] I. Friedrich, V. Weidenhof, St. Lenk und M. Wuttig:
Morphology and structure of laser-modified Ge₂Sb₂Te₅ films studied by TEM
Thin Solid Films 389, 239 (2001)

[79] V. Weidenhof, I. Friedrich, S. Ziegler und M. Wuttig:
Laser induced crystallization of amorphous Ge₂Sb₂Te₅ films
J. Applied Physics 89, 3168 (2001)

[78] X. Liu, A. Berger und M. Wuttig:
Stability of the perpendicular magnetic anisotropy of ultrathin Ni films on Cu(100) upon multiple magnetization reversals
Phys. Rev. B 63, 4407 (2001)

[77] H.-W. Wöltgens, I. Friedrich, W. Njoroge, W. Theiss und M. Wuttig:
Optical, electrical and structural properties of Al-Ti and Al-Cr thin films
Thin Solid Films 388, 237 (2001)

[76] X. Liu, M. Wuttig:
Magnetic properties of Fe/Ni bilayers on Cu(100)
Phys. Rev. B 64, 104408 (2001)

[75] B. Schirmer, X. Liu und M. Wuttig:
Unusual magnetic properties of Fe/Ni bilayers on Cu(100)
MRS Symposium Proceedings Vol. 648, P4.1 (2000)

[74] V. Weidenhof, N. Pirch, I. Friedrich, S. Ziegler und M. Wuttig:
Minimum time for laser induced amorphization of Ge₂Sb₂Te₅ films
J. Applied Physics 88, 657 (2000)

[73] I. Friedrich, V. Weidenhof, W. Njoroge, P. Franz und M. Wuttig:
Structural transformations of Ge₂Sb₂Te₅ films studied by electrical resistance measurements

J. Applied Physics 87, 4130 (2000)

[72] T. Lange, W. Njoroge, H. Weis, M. Beckers und M. Wuttig:
Physical Properties of thin GeO₂ films produced by reactive DC sputtering
Thin Solid Films 365, 82 (2000)

[71] W. Njoroge, T. Lange, H. Weis, B. Kohnen und M. Wuttig:
Defect formation upon reactive DC magnetron sputtering of GeO₂ films
J. Vac. Sci. and Technol. A 18, 42 (2000)

[70] H. Weis, T. Müggenburg, P. Grosse, L. Herlitze, I. Friedrich und M. Wuttig:
Advanced Characterization tools for thin films in Low-E systems
Thin Solid Films 351, 184 (1999)

[69] V. Weidenhof, I. Friedrich, S. Ziegler und M. Wuttig:
Atomic force microscopy study of laser induced phase transitions in Ge₂Sb₂Te₅
J. Applied Physics 86, 5879 (1999)

[68] B. Schirmer und M. Wuttig:
Antiferromagnetic coupling in fcc Fe overlayers on Ni/Cu(100)
Phys. Rev. B 60, 12945 (1999)

[67] A. Partovi, D. Peale, M. Wuttig et al.:
High-power source for near-field optics and applications to high-density optical data storage
Applied Physics Letters 75, 1515 (1999)

[66] C. A. Volkert und M. Wuttig:
Modeling of laser pulsed heating and quenching in optical data storage media
J. Applied Physics 86, 1808 (1999)

[65] T. Michely, G. Ye, V. Weidenhof und M. Wuttig:
Silver deposition on oil - cluster nucleation, growth and aggregation on a liquid surface
Surface Science 432, 228 (1999)

[64] B. Schirmer, B. Feldmann, A. Sokoll, Y. Gauthier und M. Wuttig:
Tetragonal distortion of Mn films on Cu₃Au(100)
Phys. Rev. B 60, 5895 (1999)

[63] M. Wuttig:
Neue Technologien in der optischen Datenspeicherung
Ferienkurs Forschungszentrum Jülich "Physik der Nanostrukturen" (1998)

[62] G. Ye, T. Michely, V. Weidenhof, I. Friedrich und M. Wuttig:
Nucleation, Growth, and Aggregation of Ag-Clusters on Liquid Surfaces
Phys. Rev. Lett. 81, 622 (1998)

[61] B. Schirmer, B. Feldmann und M. Wuttig:

Limits of metastable epitaxy: The structure of Fe films on Cu₃Au(100)
Phys. Rev. B 58, 4984 (1998)

[60] B. Schirmer, M. Wuttig:
Structure and growth of ultrathin iron films on Ni/Cu(001)
Surf. Sci. 399, 70 (1998)

[59] B. Feldmann, B. Schirmer, A. Sokoll und M. Wuttig:
Magnetism, structure and morphology of ultrathin Fe films on Cu₃Au(100)
Phys. Rev. B 57, 1014 (1998)

[58] Ch. Roß, B. Schirmer, M. Wuttig, Y. Gauthier, G. Bihlmayer und S. Blügel:
Structure, Growth and Magnetism of Mn on Cu(110)
Phys. Rev. B 57, 2607 (1998)

[57] A. Berger, B. Feldmann, H. Zillgen und M. Wuttig:
Correlation between the microscopic and macroscopic magnetic properties in ultrathin Fe/Cu(100) films
Journal. Magn. Magn. Mat. 183, 35 (1998)

[56] O. Rader, E. Vescovo, M. Wuttig, D.D. Sarma, S. Blügel und C. Carbone:
Correlation satellite driven by reduced dimensionality
Europhys. Lett. 39, 429 (1997)

[55] A. Braun, B. Feldmann und M. Wuttig:
Strain-induced perpendicular magnetic anisotropy in ultrathin Ni films on Cu₃Au(001)
Journal of Magn. Magn. Mater. 171, 16 (1997)

[54] O. Rader, W. Gudat, C. Carbone, E. Vescovo, S. Blügel, R. Kläsger, W. Eberhardt, M. Wuttig, J. Redinger und F.J. Himpsel:
Electronic structure of two-dimensional magnetic alloys: c(2×2)Mn on Cu(100) and Ni(100)
Phys. Rev. B 55, 5404 (1997)

[53] T. Flores, S. Junghans und M. Wuttig:
Atomic Mechanisms for the formation of an ordered surface alloy: An STM investigation of Mn/Cu(100)
Surface Sci. 371, 14 (1997)

[52] T. Flores, S. Junghans und M. Wuttig:
Atomic Mechanisms for the diffusion of Mn atoms incorporated in the Cu(100) surface: An STM study
Surface Sci. 371, 1 (1997)

[51] A. Partovi, D. Peale, C.A. Murray, G. Zydzik, L. Hopkins, J. Yeh, M. Wuttig, R. Chichester, L. Dhar, D. Vakshoori, W.S. Hobson, J. Wynn, J. Lopata:
Ultra High Density Near-Field Optical Storage
CLEO, Vol. 9, OSA Technical Digest Series, 195 (1996)

- [50] M. Wuttig und B. Feldmann:
Ultrathin metal films by design: exploiting the close correlation between structure and magnetism
Surface Review and Letters 3, 1473 (1996)
- [49] H. Ibach, M. Giesen, T. Flores, M. Wuttig und G. Tréglia:
Vacancy generation at steps and the kinetics of surface alloy formation
Surface Sci. 364, 453 (1996)
- [48] G. Tréglia, B. Legra[47] M. Wuttig, S. Junghans, T. Flores and S. Blügel:
Comment on "Structure of the Mn-induced Cu(100) $c(2 \times 2)$ surface"
Phys. Rev. B 53, 7551 C (1996)
- [47] G. Tréglia, B. Legrand, A. Saul, T. Flores und M. Wuttig:
Theoretical study of surface alloy formation through generation and annihilation of vacancies
Surf. Sci. 352-354, 552 (1996)
- [46] M. Wuttig, B. Feldmann und T. Flores:
The correlation between structure and magnetism for ultrathin metal films and surface alloys
Surface Sci. 331-333, 659 (1995)
- [45] S. Müller, P. Bayer, C. Reischl, K. Heinz, B. Feldmann, H. Zillgen und M. Wuttig:
Structural Instability of Ferromagnetic fcc Fe Films on Cu(100)
Phys. Rev. Lett. 74, 765 (1995)
- [44] H. Zillgen, B. Feldmann und M. Wuttig:
Magnetic and structural properties of Fe films deposited at low temperature on Cu(100)
Surface Sci. 321, 32 (1994)
- [43] J. Jandeleit, Y. Gauthier und M. Wuttig:
The growth and structure of Cr films on Cu(100)
Surface Sci. 319, 287 (1994)
- [42] J.-P. Jacobs, S. Reijne, S.N. Mikhailov, H.H. Brongersma und M. Wuttig:
Quantification of the Composition of Alloy and Oxide Surfaces using Low-Energy Ion Scattering
J. Vac. Sci. Technol. A 12, 2308 (1994)
- [41] Y. Gauthier, M. Poensgen und M. Wuttig:
LEED Structure Determination of the $c(8 \times 2)$ Mn Phase on Cu(100)
Surface Sci. 303, 36 (1994)
- [40] M. Wuttig:
Tailoring of materials by epitaxial growth
Habilitationsschrift, RWTH Aachen (1993)
- [39] M. Wuttig und C.C. Knight:

LEED Structure Determination of Tetragonal MnNi Films on Ni(100)
Phys. Rev. B 48, 12130 (1993)

[38] M. Wuttig, C.C. Knight und T. Flores:
Structure and Growth of Mn on Ni(100)
Phys. Rev. B 48, 12082 (1993)

[37] M. Wuttig:
Vibrational spectroscopy of clean and adsorbate covered metal surfaces
Surface Science: Principles and Applications, Springer Proceedings in Physics 73,
eds. R.F. Howe, R.N. Lamb, K. Wandelt, Berlin (1993)

[36] M. Wuttig, Y. Gauthier und S. Blügel:
Magnetically driven stabilization of the Cu(100) c(2×2)Mn surface alloy
Phys. Rev. Lett. 70, 3619 (1993)

[35] M. Wuttig, C.C. Knight, T. Flores und Y. Gauthier:
LEED Structure Determination of Two Ordered Surface Alloys:
Cu(100) c(2×2)Mn and Ni(100) c(2×2)Mn
Surface Sci. 292, 189 (1993)

[34] M. Wuttig, B. Feldmann, J. Thomassen, F. May, H. Zillgen, A. Brodde,
H. Hannemann und H. Neddermeyer:
Structural transformations of fcc iron films on Cu(100)
Surface Sci. 291, 14 (1993)

[33] M. Wuttig und J. Thomassen:
Structure Determination for Fe Films on Cu(100)
Surface Sci. 282, 237 (1993)

[32] J. Thomassen, F. May, B. Feldmann, M. Wuttig und H. Ibach:
Magnetic live layers in Fe/Cu(100)
Phys. Rev. Lett. 69, 3831 (1992)

[31] T. Flores, M. Hansen und M. Wuttig:
Structure and growth of Mn on Cu(100)
Surface Sci. 279, 251 (1992)

[30] J. Thomassen, B. Feldmann und M. Wuttig:
Growth, structure and morphology of ultrathin iron films on Cu(100)
Surface Sci. 264, 406 (1992)

[29] C. Stuhlmann, U. Beckers, J. Thomassen, M. Wuttig und H. Ibach:
Order-Disorder Transition of 6 ML Fe Films on Cu(110)
in: **The structure of surfaces III, Springer (Berlin 1991), p. 360 ff**; edited by S.Y. Tong

[28] R.M. Jaeger, H. Kuhlenbeck, H.-J. Freund, M. Wuttig, W. Hoffmann, R. Franchy und

H. Ibach:

Formation of a well ordered Aluminium oxide overlayer by oxidation of NiAl(110)
Surface Sci. 259, 235 (1991)

[27] H. Landskron, G. Schmidt, K. Heinz, K. Müller, C. Stuhlmann, U. Beckers, M. Wuttig und H. Ibach:

Low temperature $p2mg$ (2×1) structure of ultrathin epitaxial films Fe/Cu(100)
Surface Sci. 256, 115 (1991)

[26] M. Wuttig, W. Hoffmann, R. Jaeger, H. Kühlenbeck und H.-J. Freund:

Ultrathin, epitaxial aluminum oxide on NiAl(110)

in: **Heteroepitaxy of Dissimilar Materials, MRS Symposium Proceedings 221 (1991)**

[25] J.E. Müller, M. Wuttig und H. Ibach:

Comment on 'Enhanced anharmonicity in the interaction of low-Z adsorbates with metal surfaces'

Phys. Rev. Lett. 65, 1521 (1990)

[24] E. Preuss, M. Wuttig, E. Sheka, I. Natkaniec und P. Nechitaylov:

Amplitude Weighted Density of Bulk and Surface Vibrations

J. Electron Spectros. 54/55, 425 (1990)

[23] **M. Wuttig:**

Surface Phonon Dispersion of Alloy Surfaces

J. Electron Spectros. 54/55, 383 (1990)

[22] Y. Chen, M.L. Xu, S.Y. Tong, M. Wuttig, W. Hoffmann, R. Franchy und H. Ibach:

Electron-energy-loss-cross-section and Surface lattice-dynamics studies of NiAl(110)

Phys. Rev. B42, 5451 (1990)

[21] M. Wuttig, W. Hoffmann, E. Preuss, H. Ibach, Y. Chen und S.Y. Tong:

Surface-Phonon Dispersion of NiAl(110)

Phys. Rev. B42, 5443 (1990)

[20] M. Wuttig, W. Hoffmann, E. Preuss, R. Franchy und H. Ibach:

Structure and dynamics of NiAl(110)

Vacuum 41, 433 (1990)

[19] C. Stuhlmann, U. Beckers, M. Wuttig, H. Ibach und G. Schmidt:

Order-Disorder Transition of 2 ML Fe Films on the Cu(100) Surface

Vacuum 41, 408 (1990)

[18] M. Wuttig, W. Hoffmann und H. Ibach:

Surface Phonon Dispersion of $Ni_{90}Pt_{10}$ (100)

Surface Sci. 234, 231 (1990)

[17] Y. Gauthier, M. Wuttig und W. Hoffmann:

Structure and surface composition of Ni₉₀Pt₁₀(100): a LEED study
Surface Sci. 233, 239 (1990)

[16] M. Wuttig, R. Franchy und H. Ibach:
Structural models for the Cu(100) ($\sqrt{2} \times \sqrt{2}$) R45 O phase
Surface Sci. 224, L979 (1989)

[15] R. Franchy, M. Wuttig und H. Ibach:
New aspects of the disordered adsorption of oxygen on Ni(100)
Surface Sci. 215, 65 (1989)

[14] M. Wuttig, R. Franchy und H. Ibach:
Oxygen on Cu(100) - a case of an adsorbate induced reconstruction
Surface Sci. 213, 103 (1989)

[13] M. Wuttig, R. Franchy und H. Ibach:
Oxygen induced reconstruction on Cu(100)
J. Vac. Sci. Technol. A7, 1922 (1989)

[12] M. Wuttig:
Rekonstruktion und Relaxation metallischer Oberflächen
JÜL-KFA-Bericht 2213 (1988)

[11] R. Franchy, M. Wuttig und H. Ibach:
Anharmonic effects on adsorbate vibrations
Surface Sci. 203, 489 (1988)

[10] M. Wuttig, C. Oshima, T. Aizawa, R. Souda, S. Otani und Y. Ishizawa:
Surface phonons of TiC(310)
Surface Sci. 193, 180 (1988)

[9] M. Wuttig, R. Franchy und H. Ibach:
Oxygen on Cu(100): A new type of an adsorbate induced reconstruction
J. Electron Spectros. 44, 317 (1987)

[8] M. Wuttig, C. Oshima, T. Aizawa, R. Souda, S. Otani und Y. Ishizawa:
Surface phonon dispersion of HfC(100)
Surface Sci. 192, 573 (1987)

[7] R. Franchy, M. Wuttig und H. Ibach:
Adsorption of Sulfur, Carbon Monoxide and Oxygen on NiAl(111)
Surface Sci. 189/190, 438 (1987)

[6] R. Franchy, M. Wuttig, H. Ibach, T.S. Rahman und J. He:
Surface phonon dispersion of Cu(100) p(2×2)S
Surface Sci. 187, 58 (1987)

[5] C. Oshima, M. Wuttig, T. Aizawa, R. Souda, S. Otani, Y. Ishizawa, H. Ishida und T. Terakura:

The dispersion of surface phonons for TiC(100)

Phys. Rev. B 36, 7510 (1986)

[4] M. Wuttig, R. Franchy und H. Ibach:

The Rayleigh phonon dispersion on Cu(100): A stress induced frequency shift?

Z. Phys. B - Condensed Matter 65, 71 (1986)

[3] R. Franchy, M. Wuttig und H. Ibach:

Surface phonon dispersion on Cu(100) c(2×2)N

Z. Phys. B - Condensed Matter 64, 453 (1986)

[2] J.E. Müller, M. Wuttig und H. Ibach:

Adsorbate-induced surface stress: phonon anomaly and reconstruction on Ni(001) surfaces

Phys. Rev. Lett. 56, 1583 (1986)

[1] M. Wuttig, R. Franchy und H. Ibach:

The Rayleigh phonon dispersion curve on Cu(100)

Solid State Comm. 57, 445 (1986)

Books:

[1] M. Wuttig und X. Liu:

Ultrathin metal films: magnetic and structural properties

Springer Tracts in Modern Physics, Volume 206, (Berlin, Heidelberg), 2004

[2] E. R. Meinders, A.V. Mijritskii, L. van Pieterse, M. Wuttig

Optical Data Storage: Phase change media and recording

Philips Research Book Series, Springer, (Berlin) 2006

Edited Books:

[1] H. Borg, K. Bussmann, W. Egelhoff, L. Hesselink, S. Majetich, E. Murdoch, B. Stadler, M. Vazquez, M. Wuttig und J. Xiao (Editors)

Applications of ferromagnetic and optical materials, storage and magnetoelectronics

MRS Symposium Proceedings, Volume 674, Materials Research Society, (Warrendale), 2001

[2] A.Z. Moshfegh, H.v. Känel, S.C. Kashyap, M. Wuttig (Editors)

Physics and Technology of Thin Films

World Scientific, (Singapore), 2004

[3] S. Raoux and M. Wuttig (Editors):

Phase Change Materials: Science and Applications

Springer, (New York), 2009

Approx. 450 p. 260 illus., Hardcover

ISBN: 978-0-387-84873-0

Patente:

1.) Patent Nr. DE 199 08 054, Erfinder: B. Schirmer, M. Wuttig:

Ungekoppelter GMR-Sensor

2.) Patent Nr. DE 102 006 029 6834, Erfinder: M. Wuttig, D. Severin:

Verfahren zur Herstellung eines beschichteten Gegenstandes durch Sputtern eines keramischen Targets

3.) Patent Nr. 12/285,419 v. 6.10.2008, Erfinder: Y. Khang, D. Wamwangi, M. Wuttig:

4.) Patentanmeldung Nr. DE 102009017113.4, Erfinder: D. Köhl, M. Luysberg, M. Wuttig:

Sputterverfahren mit hoher kristalliner Ordnung und Bauelement