References

[1] S. Klaumnzer. Ion tracks in quartz and vitreous silica. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms*, 225(12):136 – 153, 2004. The Evolution of Ion Tracks and Solids.

[2] A. V. Krasheninnikov and K. Nordlund. Ion and electron irradiation-induced effects in nanostructured materials. *Journal of Applied Physics*, 107(7):071301 – 071301–70, 2010.

[3] William J. Weber, Dorothy M. Duffy, Lionel Thom, and Yanwen Zhang. The role of electronic energy loss in ion beam modification of materials. *Current Opinion in Solid State and Materials Science*, 19(1):1 – 11, 2015. Ion Beam Modification of Materials.

[4] P. Kluth, C. S. Schnohr, O. H. Pakarinen, F. Djurabekova, D. J. Sprouster, R. Giulian, M. C. Ridgway, A. P. Byrne, C. Trautmann, D. J. Cookson, K. Nordlund, and M. Toulemonde. Fine structure in swift heavy ion tracks in amorphous sio_2. *Phys. Rev. Lett.*, 101:175503, 2008.

[5] P. Kluth, O. H. Pakarinen, F. Djurabekova, R. Giulian, M. C. Ridgway, A. P. Byrne, and K. Nordlund. Nanoscale density fluctuations in swift heavy ion irradiated amorphous sio2. *Journal of Applied Physics*, 110(12):123520, 2011.

[6] D M Duffy and A M Rutherford. Including the effects of electronic stopping and electronion interactions in radiation damage simulations. *Journal of Physics: Condensed Matter*, 19(1):016207, 2007.

[7] A M Rutherford and D M Duffy. The effect of electronion interactions on radiation damage simulations. *Journal of Physics: Condensed Matter*, 19(49):496201, 2007.

[8] M. C. Ridgway, R. Giulian, D. J. Sprouster, P. Kluth, L. L. Araujo, D. J. Llewellyn, A. P. Byrne, F. Kremer, P. F. P. Fichtner, G. Rizza, H. Amekura, and M. Toulemonde. Role of thermodynamics in the shape transformation of embedded metal nanoparticles induced by swift heavy-ion irradiation. *Phys. Rev. Lett.*, 106:095505, Mar 2011.

[9] Carolyn L. Phillips, Rudolph J. Magyar, and Paul S. Crozier. A two-temperature model of radiation damage in -quartz. *The Journal of Chemical Physics*, 133(14):144711, 2010.

[10] A. A. Leino, S. L. Daraszewicz, O. H. Pakarinen, K. Nordlund, and F. Djurabekova. Atomistic two-temperature modelling of ion track formation in silicon dioxide. *EPL (Europhysics Letters)*, 110(1):16004, 2015.

[11] Galvin S Khara, Samuel T Murphy, Szymon L Daraszewicz, and Dorothy M Duffy. The influence of the electronic specific heat on swift heavy ion irradiation simulations of silicon. *Journal of Physics: Condensed Matter*, 28(39):395201, 2016.

[12] Paolo Giannozzi, Stefano Baroni, Nicola Bonini, Matteo Calandra, Roberto Car, Carlo Cavazzoni, Davide Ceresoli, Guido L Chiarotti, Matteo Cococcioni, Ismaila Dabo, Andrea Dal Corso, Stefano de Gironcoli, Stefano Fabris, Guido Fratesi, Ralph Gebauer, Uwe Gerstmann, Christos Gougoussis, Anton Kokalj, Michele Lazzeri, Layla Martin-Samos, Nicola Marzari, Francesco Mauri, Riccardo Mazzarello, Stefano Paolini, Alfredo Pasquarello, Lorenzo Paulatto, Carlo Sbraccia, Sandro Scandolo, Gabriele Sclauzero, Ari P Seitsonen, Alexander Smogunov, Paolo Umari, and Renata M Wentzcovitch. Quantum espresso: a modular and open-source software project for quantum simulations of materials. *Journal of Physics: Condensed Matter*, 21(39):395502, 2009.

[13] Quantum espresso website: http://www.quantum-espresso.org/.

[14] G Kresse and J Furthmuller. Efficient iterative schemes for ab initio total-energy calculations using a plane-wave basis set. *Physical Review B*, 54(16):11169–11186, 1996.

[15] G Kresse and J Furthmuller. Efficiency of ab-initio total energy calculations for metals and semiconductors using a plane-wave basis set. *Computational Materials Science*, 6(1):15–50, 1996.

[16] Vienna ab initio simulation package (vasp) website: https://www.vasp.at/.

[17] B. Haberl, A. C. Y. Liu, J. E. Bradby, S. Ruffell, J. S. Williams, and P. Munroe. Structural characterization of pressure-induced amorphous silicon. *Physical Review B*, 79(15), 2009.

[18] Konstantin B. Borisenko, Bianca Haberl, Amelia C. Y. Liu, Yixin Chen, Guoqiang Li, James S. Williams, Jodie E. Bradby, David J. H. Cockayne, and Michael M. J. Treacy. Medium-range order in amorphous silicon investigated by constrained structural relaxation of two-body and four-body electron diffraction data. *Acta Materialia*, 60(1):359–375, 2012.

[19] Bianca Haberl, Malcolm Guthrie, Brad D. Malone, Jesse S. Smith, Stanislav V. Sinogeikin, Marvin L. Cohen, James S. Williams, Guoyin Shen, and Jodie E. Bradby. Controlled formation of metastable germanium polymorphs. *Physical Review B*, 89(14), 2014.

[20] E. Holmstrom, B. Haberl, O. H. Pakarinen, K. Nordlund, F. Djurabekova, R. Arenal, J. S. Williams, J. E. Bradby, T. C. Petersen, and A. C. Y. Liu. Dependence of short and intermediate-range order on preparation in experimental and modeled pure a-Si. *Journal of Non-Crystalline Solids*, 438:26–36, 2016.

[21] F Wooten, K Winer, and D Weaire. Computer-Generation of Structural Models of Amorphous Si and Ge. *Physical Review Letters*, 54(13):1392–1395, 1985.

[22] S. R. Bahn and K. W. Jacobsen. An object-oriented scripting interface to a legacy electronic structure code. *Comput. Sci. Eng.*, 4(3):56–66, 2002.

[23] Atomic simulation environment (ase) website: https://wiki.fysik.dtu.dk/ase/.

[24] Benjamin P. de Laune, Gregory J. Rees, Mariana J. Whitaker, Hien-Yoong Hah, Charles E. Johnson, Jacqueline A. Johnson, Dennis E. Brown, Matthew G. Tucker, Thomas C. Hansen, Frank J. Berry, John V. Hanna, and Colin Greaves. Oxygen insertion reactions within the one-dimensional channels of phases related to fesb2o4. *Inorganic Chemistry*, 56(1):594–607, 2017.

[25] G Henkelman, BP Uberuaga, and H Jonsson. A climbing image nudged elastic band method for finding saddle points and minimum energy paths. *Journal of Chemical Physics*, 113(22):9901–9904, 2000.

[26] G Henkelman and H Jonsson. Improved tangent estimate in the nudged elastic band method for finding minimum energy paths and saddle points. *Journal of Chemical Physics*, 113(22):9978–9985, 2000.

[27] Steve Plimpton. Fast parallel algorithms for short-range molecular dynamics. *Journal of Computational Physics*, 117(1):1 – 19, 1995.

[28] Large-scale atomistic/molecular massively parallel simulator (lammps) website: http://lammps.sandia.gov.

[29] Lammps benchmarking website: http://lammps.sandia.gov/bench.html.

[30] Joshua A. Anderson, Chris D. Lorenz, and A. Travesset. General purpose molecular dynamics simulations fully implemented on graphics processing units. *Journal OF Computational Physics*, 227(10):5342–5359, MAY 1 2008.

[31] Jens Glaser, Trung Dac Nguyen, Joshua A. Anderson, Pak Lui, Filippo Spiga, Jaime A. Millan, David C. Morse, and Sharon C. Glotzer. Strong scaling of general-purpose molecular dynamics simulations on GPUs. *Computer Physics Communications*, 192:97–107, 2015.

[32] Neutron vibrational spectrometer at the spallation neutron source (vision) website: https://neutrons.ornl.gov.

[33] Stewart J Clark, Matthew D Segall, Chris J Pickard, Phil J Hasnip, Matt IJ Probert, Keith Refson, and Mike C Payne. First principles methods using castep. *Zeitschrift für Kristallographie-Crystalline Materials*, 220(5/6):567–570, 2005.

[34] X. Gonze, J.-M. Beuken, R. Caracas, F. Detraux, M. Fuchs, G.-M. Rignanese, L. Sindic, M. Verstraete, G. Zerah, F. Jollet, M. Torrent, A. Roy, M. Mikami, Ph. Ghosez, J.-Y. Raty, and D.C. Allan. First-principles computation of material properties the abinit software project. *Computational Materials Science*, 25(3):478 – 492, 2002.

[35] X. Gonze, B. Amadon, P.-M. Anglade, J.-M. Beuken, F. Bottin, P. Boulanger, F. Bruneval, D. Caliste, R. Caracas, M. Ct, T. Deutsch, L. Genovese, Ph. Ghosez, M. Giantomassi, S. Goedecker, D.R. Hamann, P. Hermet, F. Jollet, G. Jomard, S. Leroux, M. Mancini, S. Mazevet, M.J.T. Oliveira, G. Onida, Y. Pouillon, T. Rangel, G.-M.

Rignanese, D. Sangalli, R. Shaltaf, M. Torrent, M.J. Verstraete, G. Zerah, and J.W. Zwanziger. Abinit: First-principles approach to material and nanosystem properties. *Computer Physics Communications*, 180(12):2582 – 2615, 2009.

[36] Cambridge serial total energy package (castep) website: http://www.castep.org/.

[37] Juerg Hutter, Marcella Iannuzzi, Florian Schiffmann, and Joost VandeVondele. CP2K: atomistic simulations of condensed matter systems. *Wiley Iinterdisciplinary Reviews-Computational Molecular Science*, 4(1):15–25, 2014.

[38] E. L. Briggs, D. J. Sullivan, and J. Bernholc. Real-space multigrid-based approach to large-scale electronic structure calculations. *Phys. Rev. B*, 54:14362–14375, Nov 1996.

[39] Real space multigrid density functional theory code (rmg-dft) website: http://rmgdft.sourceforge.net/.

[40] A.J. Ramirez-Cuesta. aclimax 4.0.1, the new version of the software for analyzing and interpreting {INS} spectra. *Computer Physics Communications*, 157(3):226 – 238, 2004.

[41] Matthew G Tucker, David A Keen, Martin T Dove, Andrew L Goodwin, and Qun Hui. Rmcprofile: reverse monte carlo for polycrystalline materials. *Journal of Physics: Condensed Matter*, 19(33):335218, 2007.

[42] Reverse monte carlo profile (rmcprofile) website: http://www.rmcprofile.org.

[43] Eclipse intergrated computationl environment website: https://projects.eclipse.org/projects/science.ice.

[44] J. Tersoff. Empirical interatomic potential for silicon with improved elastic properties. *Phys. Rev. B*, 38:9902–9905, Nov 1988.

[45] T. Kumagai, S. Izumi, S. Hara, and S. Sakai. Development of bond-order potentials that can reproduce the elastic constants and melting point of silicon for classical molecular dynamics simulation. *Computational Materials Science*, 39(2):457 – 464, 2007.