

BIBLIOGRAPHY

[1611Kep] Johannes Kepler, *De Nive Sexangular*, translated to *The Six-Cornered Snowflake*, by Jacques Bromberg, Paul Dry Books, 2010.

[1637Des] René Descartes, *Les Météores*, in *Discours de la Methode*, Leiden, 1637.

[1665Hoo] Robert Hooke, *Micrographia*, Royal Society (London), 1665.

[1820Sco] William Scoresby, *An Account of the Arctic Regions with a History and Description of the Northern Whale-Fishery*, Edinburgh, 1820.

[1859Far] Michael Faraday, *Experimental Researches in Chemistry and Physics*, Taylor and Francis (London), 1859.

[1871Tho] W. Thomson, On the equilibrium vapor at a curved surface of liquid, *Phil. Mag.* 42, 448-452, 1871.
First description of the Gibbs-Thomson effect.

[1882Her] H. Hertz, *Ann. Phys. Lpz.* 17, 193, 1882.

[1900Wil] Harold A. Wilson, On the velocity of solidification and viscosity of supercooled liquids, *Phil. Mag.* 50, 238, 1900.

[1904Koc] Helge von Koch, Sur une courbe continue sans tangente, obtenue par une construction géométrique élémentaire, *Ark. Math. Astron. Fys.* 1, 681-702, 1904.

[1910Lin] F. A. Lindemann, The calculation of molecular natural frequencies, *Z. Phys.* 11, 609-612, 1910.

Found evidence that melting occurs if lattice vibration amplitudes exceed a certain threshold, for a broad range of crystalline solids. Now called the *Lindemann criterion*, this empirical rule provides an intuitive explanation for surface melting.

[1915Knu] M. Knudsen, *Ann. Phys. Lpz.* 47, 697, 1915.

[1917Tho] D'Arcy Wentworth Thompson, *On Growth and Form*, Cambridge University Press, 1917.

[1929Bar] William Howard Barnes, The crystal structure of ice between 0 C and -183 C, *Proc. R. Soc. Lond. A*, 1929.

[1928Str] I. N. Stranski, *Z. phys. Chem.* 136, 259, 1928.

[1931Ben] Wilson Bentley and William Humphreys, *Snow Crystals*, McGraw-Hill (New York), 1931.

[1932Fre] J. Frenkel, *Phys. Z. Sowjetunion* 1, 498, 1932.

[1933Ber] J. D. Bernal and R. H. Fowler, A theory of water and ionic solution, with particular reference to hydrogen and hydroxyl ions, *J. Chem. Phys.* 1, 515, 1933.

[1934Str] I. N. Stranski and R. Kaischew, *Z. phys. Chem. B* 26, 31, 1934.

[1935Bec] R. Becker and W. Döring, *Ann. Phys. Lpz.* 24, 719, 1935.

[1939Vol] M. Volmer, *Kinetik der Phasenbildung*, Dresden und Leipzig (Steinkopff), 1939.

[1947Iva] G. P. Ivantsov, *Dokl. Akad. Nauk USSR* 58, 1113, 1947.

[1948Von] B. Vonnegut, *G. E. Res. Lab., Project Cirrus Occas. Rep. no. 5*, 1948.

[1949Sch] V. J. Schaefer, The formation of ice crystals in the laboratory and the atmosphere, *Chem. Rev.* 44, 291, 1949.

[1951Bur] W. K. Burton, N. Cabrera, and F. C. Frank, The growth of crystals and the

equilibrium structure of their surfaces, *Phil. Trans. Royal Soc. London* 243, 299-358, 1951.

[1952Sch] Vincent J. Schaefer, Formation of ice crystals in ordinary and nuclei-free air, *Indust. Engr. Chem.* 44, 1300-1304, 1952.

[1954Nak] Ukichiro Nakaya, *Snow Crystals, Natural and Artificial*, Harvard University Press: Cambridge, 1954.

[1955Sea] G. W. Sears, A growth mechanism for mercury whiskers, *Acta Metal.* 3, 361-366", 1955.

[1956Hil] W. B. Hillig and D. Turnbull, Theory of crystal growth in undercooled pure liquids, *J. Chem. Phys.* 24, 914, 1956.

[1958Hal] J. Hallett and B. J. Mason, The influence of temperature and supersaturation on the habit of ice crystals grown from the vapour, *Proc. Roy. Soc. A*247, 440-453, 1958.

[1958Hil] W. B. Hillig, The kinetics of freezing of ice in the direction perpendicular to the basal plane, in *Growth and Perfection of Crystals* (eds. R. H. Doremus, B. W. Roberts, and D. Turnbull), 350-360, 1958.

[1958Nak] U. Nakaya, M. Hanajima, and J. Mugurama, Physical investigations of the growth of snow crystals, *J. Fac. Sci. Hokkaido Univ.*, Ser. II-5, 87, 1958.

[1961Kob] T. Kobayashi, The growth of snow crystals at low supersaturations, *Philos. Mag.* 6, 1363-1370, 1961.

[1961Tho] D'Arcy Wentworth Thompson, *On Growth and Form* (abridged edition, edited by John Tyler Bonner), Cambridge University Press, 1961.

[1962Bla] J. M. Blakely and K. A. Jackson, Growth of crystal whiskers, *J. Chem. Phys.* 37, 428-430, 1962.

[1963Bar] J. T. Bartlett, A. P. van den Heuvel, and B. J. Mason, Growth of ice crystals in an electric field, *Zeit. Fur Ange. Math. Phys.* 14, 599-610, 1963.

[1963Mas] B. J. Mason and G. W. Bryant and A. P. Van den Heuvel, The growth habits and surface structure of ice crystals, *Phil. Mag.* 8, 505-526, 1963.

[1963Mul] W. W. Mullins and R. F. Sekerka, Morphological stability of a particle growing by diffusion or heat flow, *J. Appl. Phys* 34, 323-329, 1963.

[1963Par] R. L. Parker and et al., Growth and evaporation kinetics and surface diffusion of K and Hg whiskers, *Appl. Phys. Lett.* 3, 93-95, 1963.

[1964Hal] J. Hallett, Experimental studies of the crystallization of supercooled water, *J. Atmo. Sci.* 21, 671-682, 1964.

[1964Mul] W. W. Mullins and R. F. Sekerka, Stability of a planar interface during solidification of dilute binary alloy, *J. Appl. Phys* 35, 444-451, 1964.

[1965Kni] Charles A. Knight and Nancy C. Knight, "Negative" Crystals in Ice: A Method for Growth, *Science* 150, 1819-1821, 1965.

[1965Mac] W. C. Macklin and B. F. Ryan, The structure of ice grown in bulk supercooled water, *J. Atmos. Sci.* 22, 452-459, 1965.

[1965Rei] F. Reif, *Fundamentals of Statistical and Thermal Physics*, McGraw-Hill, 1965.

My favorite advanced stat-mech book; others are likely just as good.

[1966Mag] C. Magono and C. Lee, Meteorological classification of natural snow crystals, *J. Fac. Sci. Hokkaido* 2, 321-355, 1966.

[1966Mic] A. S. Michaels, P. L. T. Brian and P. R. Sperry, Impurity effects on the basal plane

solidification kinetics of supercooled water, J. Appl. Phys. 37, 4649-4661, 1966.

[1967Pru] H. R. Pruppacher, On the growth of ice aqueous solutions contained in capillaries, Zeit. fur Natur. A 22, 895-901, 1967.

[1968Rya] B. F. Ryan and W. C. Macklin, The growth of ice in supercooled aqueous solutions, J. Crystal. Growth 2, 337-340, 1966.

[1969And] B. J. Anderson, J. D. Sutkoff, and J. Hallett, Influence of Methyl 2-Cyanoacrylate monomer on habit of ice crystals grown from vapor, J. Atmos. Sci. 26, 673-674, 1969.

[1969Rya] B. F. Ryan, The growth of ice parallel to the basal plane in supercooled water and supercooled metal fluoride solutions, J. Crystal. Growth 5, 284-288, 1969.

[1970Fle] N. H. Fletcher, *The Chemical Physics of Ice*, Cambridge University Press, 1970.

[1971Iwa] Kunimoto Iwai, Note on Snow Crystals of Spatial Type, J. Meteor. Soc. Japan 49, 516-520, 1971.

[1971Mas] B. J. Mason, *The Physics of Clouds*, Clarendon Press: Oxford, 1971.

[1972Lam] D. Lamb and W. D. Scott, Linear growth rates of ice crystals grown from the vapor phase, J. Cryst. Growth 12, 21-31, 1972.

[1974Hob] Peter V. Hobbs, *Ice Physics*, Oxford University Press: Oxford, 1974.

[1974Yam] A. Yamashita and Kisho Kenkyu Noto, Studies on the ice crystals using a large diffusion chamber, Meteor. Soc. Japan 123, 47-97, 1974.

[1976Gli] M. E. Glicksman, R. J. Schaefer, and J. D. Ayers, Dendritic growth – test of theory, Metal. Trans. A 7, 1747-1759, 1976.

[1976Gon] Takehiko Gonda, The growth of small ice crystal in gases of high and low pressures, J. Meteor. Soc. Japan 54, 233-240, 1976.

[1978Fur] Y. Furukawa and T. Kobayashi, On the growth mechanism of polycrystalline snow crystals with a specific grain boundary, J. Cryst. Growth 45, 57-65, 1978.

[1978Lan] J. S. Langer, R. F. Sekerka, and T. Fujioka, Evidence for a universal law of dendritic growth rates, J. Cryst. Growth 44, 414-418, 1978.

[1979And] B. J. Anderson and J. Hallett, Influence of environmental saturation and electric field on growth and evaporation of epitaxial ice crystals, J. Cryst. Growth 46, 427-444, 1979.

[1980Lan] J. S. Langer, Instabilities and pattern formation in crystal growth, Rev. Mod. Phys. 52, 1-28 (1980).

An excellent introduction to the topic. See also [1989Lan].

[1981Hua] S.-C. Huang and M. E. Glicksman, Overview 12: Fundamentals of dendritic solidification – II Development of sidebranch structure, Acta Metall. 29, 717-734, 1981.

[1981Wit] T. Witten and L. Sander, Diffusion-limited aggregation, a kinetic critical phenomenon, Phys. Rev. Lett. 47, 1400-1403, 1981.

[1982Bec1] W. Beckmann, Interface kinetics of the growth and evaporation of ice single crystal from the vapor phase - Part I: Experimental techniques, J. Cryst. Growth 58, 425-432, 1982.

[1982Bec2] W. Beckmann and R. Lacmann, Interface kinetics of the growth and evaporation of ice single crystal from the vapor phase - Part II: Measurements in a pure water vapour environment, J. Cryst. Growth 58, 433-442, 1982.

- [1982Bec3] W. Beckmann, Interface kinetics of the growth and evaporation of ice single crystal from the vapor phase - Part III: Measurements under partial pressures of nitrogen, *J. Cryst. Growth* 58, 443-451, 1982.
- [1982Fra] F. C. Frank, Snow Crystals, *Contemp. Phys.* 23, 3-22, 1982.
- [1982Gon] T. Gonda and T. Koike, Growth rates and growth forms of ice crystal grown from the vapour phase, *J. Cryst. Growth* 56, 259-264, 1982.
- [1982Kur] T. Kuroda and R. Lacmann, Growth kinetics of ice from the vapour phase and its growth forms, *J. Cryst. Growth* 56, 189-205, 1982.
- [1983Bec] W. Beckmann and R. Lacmann and A. Blerfreund, Growth rates and habits of ice crystals grown from the vapor phase, *J. Phys. Chem.* 87, 4142-4146, 1983.
- [1983Fix] G. J. Fix, in *Free Boundary Problems: Theory and Application*, edited by A. Fasano and M. Primicerio, Pitman (Boston), 1983.
- [1984Cho] N. Cho and J. Hallett, Epitaxial ice crystal growth on covellite (CuS) - I. Influence of misfit strain on the growth of non-thickening crystals, *J. Cryst. Growth* 69, 317-324, 1984.
- [1984Cho1] N. Cho and J. Hallett, Epitaxial ice crystal growth on covellite (CuS) - II. Growth characteristic of basal plane steps, *J. Cryst. Growth* 69, 325-334, 1984.
- [1984Jac] K. A. Jackson, Crystal growth kinetics, *Mat. Sci. Engr.* 65, 7-13, 1984.
- [1984Kur] Toshio Kuroda, Rate determining processes of growth of ice crystals from the vapour phase - Part I: Theoretical considerations, *J. Meteor. Soc. Jap.* 62, 1-11, 1984.
- [1984Kur1] Toshio Kuroda and Takehiko Gonda, Rate determining processes of growth of ice crystals from the vapour phase - Part II: Investigation of surface kinetic processes, *J. Meteor. Soc. Jap.* 62, 563-572, 1984.
- [1985Col] S. C. Colbeck, Temperature dependence of the equilibrium shape of ice, *J. Cryst. Growth* 72, 726-732, 1985.
- [1985Col1] Joseph B. Collins and Herbert Levine, Diffuse interface model of diffusion-limited crystal growth, *Phys. Rev. B* 31, 6119-6122, 1985.
- [1985Wol] P. E. Wolf and F. Gallet and S. Balibar and E. Rolley and P. Nozieres, Crystal growth and crystal curvature near roughening transitions in hcp 4He, *J. de Physique* 46, 1987-2007, 1985.
- [1986Lan] J. S. Langer, Models of pattern formation in first-order phase transitions, in *Directions in Condensed Matter Physics*, World Scientific (Singapore), 1986.
- [1986Moz] M. Mozurkewich, Aerosol growth and the condensation coefficient for water, *Aerosol Sci. Tech.* 5, 223-236, 1986.
- [1986Pac] N. H. Packard, Lattice models for solidification and aggregation, in *Science on Form: Proceedings of the First International Symposium for Science on Form*, edited by S. Ishizaka et al., Scientific Publishers (Tokyo), 1986.
- [1987Kar] O. A. Karim and A. D. J. Haymet, The ice water interface, *Chem. Phys. Lett.* 138, 531-534, 1987.
- [1987Kob] T. Kobayashi and T. Kuroda, *Snow crystals: Morphology of Crystals - Part B*, Terra Scientific, Tokyo, 1987.

[1988Kar] O. A. Karim and A. D. J. Haymet, The ice water interface - A molecular-dynamics study, *J. Chem. Phys.* 89, 6889-6896, 1988.

[1988Kes] D. A. Kessler and J. Koplik and H. Levine, Pattern selection in fingered growth phenomena, *Adv. Phys.* 37, 255-339, 1988.

[1988Sai] Y. Saito, G. Goldbeck-Wood, and H. Muller-Krumbhaar, Numerical simulation of dendritic growth, *Phys. Rev. A* 38, 2148-2157, 1988.

[1988Tak] Tsuneya Takahashi and Norihiko Fukuta, Supercooled cloud tunnel studies on the growth of snow crystals between -4 C and -20 C, *Meteor. Soc. Japan* 66, 841-855, 1988.

[1988Xia] R.-F. Xiao, J. I. D. Alexander, and F. Rosenberger, Morphological evolution of growing crystals: A Monte Carlo simulation, *Phys. Rev. A* 38, 2447-2456, 1988.

[1989Bru] L. N. Brush and R. F. Sekerka, A numerical study of two-dimensional crystal growth forms in the presence of anisotropic growth kinetics, *J. Cryst. Growth* 96, 419-441, 1989.

[1989Lan] J. S. Langer, Dendrites, viscous fingers, and the theory of pattern formation, *Science* 243, 1150-1156 (1989).

An excellent introduction to the fundamental results in solvability theory. See also [1980Lan].

[1989Sei] T. Sei and T. Gonda, The growth mechanism and the habit change of ice crystals growing from the vapor phase, *J. Cryst. Growth* 94, 697-707, 1989.

[1990Gon] T. Gonda and S. Nakahara and T. Sei, The formation of side branches of dendritic ice crystals growing from vapor and solution, *J. Cryst. Growth* 90, 183-187, 1990.

[1990Yok] Etsuro Yokoyama and Toshio Kuroda, Pattern formation in growth of snow crystals occurring in the surface kinetic process

and the diffusion process, *Phys. Rev. A* 41, 2038-2049, 1990.

[1991Bre] E. A. Brener and V. I. Melnikov, Pattern selection in 2-dimensional dendritic growth, *Adv. Phys.* 40, 53-97, 1991.

[1991Bre1] E. A. Brener and V. I. Melnikov, Roughening transition observed on the prism facet of ice, *Phys. Rev. Lett.* 67, 2982-2985, 1991.

[1991Elb] M. Elbaum, Roughening transition observed on the prism facet of ice, *Phys. Rev. Lett.* 67, 2982-2985, 1991.

Surface roughening of prism facet

[1991Kni] C. A. Knight and C. C. Cheng and A. L. Devries, Adsorption of alpha-helical antifreeze peptides on specific ice crystal surfaces, *Biophys. J.* 59, 409-418, 1991.

[1991Mik] L. V. Mikheev and A. A. Chernov, Mobility of a diffuse simple crystal-melt interface, *J. Cryst. Growth* 112, 591-596, 1991.

[1991Tak] T. Takahashi et al, Vapor diffusional growth of free-falling snow crystals between -3 and -23 C, *J. Meteor. Soc. Japan* 69, 15-30, 1991.

[1992Bie] M. Bienfait, Roughening and surface melting transitions: consequences on crystal growth, *Surf. Sci.* 272, 1-9, 1992.

[1993Cro] M. C. Cross and P. C. Hohenberg, Pattern formation outside of equilibrium, *Rev. Mod. Phys.* 65, 851-1112, 1993.

[1993Fur] Yoshinori Furukawa and Shigetsugu Kohata, Temperature dependence of the growth form of negative crystal in an ice single crystal and evaporation kinetics for its surfaces, *J. Cryst. Growth* 129, 571-581, 1993.

[1993Fur1] Yoshinori Furukawa and Wataru Shimada, Three-dimensional pattern formation during growth of ice dendrites – its

relation to universal law of dendritic growth, J. Cryst. Growth 128, 234-239, 1993.

[1993Kob] Ryo Kobayashi, Modeling and numerical simulations of dendritic crystal growth, Physica D 63, 410-423, 1993.

[1993McF] G. B. McFadden et al., Phase-field models for anisotropic interfaces, Phys. Rev. E 48, 2016-2024, 1993.

[1993Yok] Etsuro Yokoyama, Formation of patterns during growth of snow crystals, J. Cryst. Growth 128, 251-257, 1993.

[1994Kob] Ryo Kobayashi, A numerical approach to three-dimensional dendritic solidification, Exp. Math. 3, 59-81, 1994.

[1994Tri] R. Trivedi and W. Kurz, Dendritic growth, Inter. Mater. Rev. 39, 49-74, 1994.

[1994Ven] J. A. Venables, Atomic processes in crystal growth, Surf. Sci. 299, 798-817, 1994.

[1995Dos] H. Dosch and A. Lied and J. H. Bilgram, Glancing-angle X-ray scattering studies of the premelting of ice surfaces, Surf. Sci. 327, 145-164, 1995.

[1996Bre] E. A. Brener, Three-dimensional dendritic growth, J. Cryst. Growth 166, 339-346, 1996.

[1996Kar] A. Karma and W. J. Rappel, Phase-field method for computationally efficient modeling of solidification with arbitrary interface kinetics, Phys. Rev. E 53, R3017-R3020, 2006.

[1996Kas] K. Kassner, *Pattern Formation in Diffusion-limited Crystal Growth*, World Scientific Publishing, 1996.

[1996Kni] Charles A. Knight, A simple technique for growing large, optically perfect ice crystals, J. Glaciology 42, 585-587, 1996.

[1996Nad] H. Nada and Y. Furukawa, Anisotropic growth kinetics of ice crystals from water studied by molecular dynamics simulation, J. Cryst. Growth 169, 587-597, 1996.

[1998Nel] Jon Nelson and Charles A. Knight, A new technique for growing crystal from the vapor, J. Cryst. Growth 169, 795-797, 1996.

[1996Sai] Y. Saito, *Statistical Physics of Crystal Growth*, World Scientific Books, 1996.

[1996Sch] A. Schmidt, Computation of three dimensional dendrites with finite elements, J. Comp. Phys. 125, 293-312, 1996.

[1997Fur] Yoshinori Furukawa and Hiroki Nada, Anisotropic surface melting of an ice crystal and its relationship to growth forms, J. Phys. Chem. B 101, 6167-6170, 1997.

[1997Gon] T. Gonda and S. Nakahara, Dendritic ice crystals with faceted tip growing from the vapor phase, J. Cryst. Growth 173, 189-193, 1997.

[1997Jef] C. A. Jeffery and P. H. Austin, Homogeneous nucleation of supercooled water - Results from a new equation of state, J. Geophys. Res. 102, 25269-25279, 1997.

[1997Mar] Minoru Maruyama and Yuko Kishimoto and Tsutomu Sawada, Optical study of roughening transition on ice Ih (1010) planes under pressure, J. Cryst. Growth 172, 521-527, 1997.

[1997Pru] H. R. Pruppacher and J. D. Klett, *Microphysics of Clouds and Precipitation*, Kluwer Academic Publishers, 1997.

[1998Hil] Measurement of interfacial free energy for ice/water system, J. Cryst. Growth 183, 463-468, 1998.

[1998Kar] A. Karma and W. J. Rappel, Quantitative phase-field modeling of dendritic

growth in two and three dimensions, *Phys. Rev. E* 57, 4323-4349, 1998.

[1998Lib] K. G. Libbrecht and V. M. Tanusheva, Electrically induced morphological instabilities in free dendrite growth, *Phys. Rev. Lett.* 81, 176-179, 1998.

[1998Nel] Jon Nelson and Charles Knight, Snow crystal habit changes explained by layer nucleation, *J. Atmos. Sci.* 55, 1452-1465, 1998.

[1999Bre] E. A. Brener and H. Muller-Krumbhaar, Comment on "Electrically induced morphological instabilities in free dendrite growth", *Phys. Rev. Lett.* 83, 1698-1698, 1999.

[1999Fuk] Norihiko Fukuta and Tsuneya Takahashi, The growth of atmospheric ice crystals: A summary of finding in vertical supercooled cloud tunnel studies, *Am. Meteor. Soc.* 56, 1963-1979, 1999.

[1999Lib] K. G. Libbrecht, Cylindrically symmetric Green's function approach for modeling the crystal growth morphology of ice, *Phys. Rev. E* 60, 1967-1974, 1999.

[1999Lib1] K. G. Libbrecht and V. M. Tanusheva, Comment on "Electrically induced morphological instabilities in free dendrite growth" - Libbrecht and Tanusheva reply, *Phys. Rev. Lett.* 83, 1699-1699, 1999.

[1999Lib2] Kenneth G. Libbrecht and Victoria M. Tanusheva, Cloud chambers and crystal growth: Effects of electrically enhanced diffusion on dendrite formation from neutral molecules, *Phys. Rev. E* 59, 3253-3261, 1999.

[1999Pet] Victor F. Petrenko and Robert W. Whitworth, *Physics of Ice*, Oxford University Press: Oxford, 1999.

[1999Pim] Alberto Pimpinelli and Jacques Villain, *Physics of Crystal Growth*, Cambridge University Press: Cambridge, 1999.

[1999Swa] B. D. Swanson, M. J. Bacon, E. J. Davis, et al., Electrodynamic trapping and manipulation of ice crystals, *Quart. J. Roy. Meteor. Soc.* 125, 1039-1058, 1999.

[2000Bol] Kim Bolton and Jan B. C. Pettersson, A molecular dynamics study of the long-time ice Ih surface dynamics, *J. Phys. Chem. B* 104, 1590-1595, 2000.

[2000Wan] W. Wang, Lyophilization and development of solid protein pharmaceuticals, *Int. J. of Pharmaceutics* 203, 1-60, 2000.

[2001Bon] H. P. Bonzel, Equilibrium crystal shapes: towards absolute energies, *Prog. Surf. Sci.* 67, 45-58, 2001.

[2001Kni] C. A. Knight and A. Wierzbicki, Adsorption of biomolecules to ice and their effects on ice growth. 2. A discussion of the basic mechanism of antifreeze phenomena, *Cryst. Growth. Design* 1, 439-446, 2001.

[2001Lib] K. G. Libbrecht and H. Yu, Crystal growth in the presence of surface melting: supersturation dependence of the growth of columnar ice crystals, *J. Cryst. Growth* 222, 822-831, 2001.

[2001Nel] J. Nelson, Growth mechanisms to explain the primary and secondary habits of snow crystals, *Phil. Mag.* 81, 2337-2373, 2001.

[2001Shi] A. A. Shibkov and et al., Kinetics and morphology of nonequilibrium growth of ice in supercooled water, *Crystallography Rep.* 46, 496-502, 2001.

[2001Woo] Stephen E. Wood and Marcia B. Baker, New model for vapor growth of hexagonal ice crystals in the atmosphere, *J. Geophys. Res.* 106, 4845-4870, 2001.

[2002Boe] W. J. Boettinger and J. A. Warren and C. Beckermann and et al., Phase-field

simulation of solidification, *Ann. Rev. Mat. Sci.* 32, 163-194, 2002.

[2002Bro] P. Broekmann and A. Mewe and H. Wormeester and et al., Step edge selection during ion erosion of Cu(001), *Phys. Rev. Lett.* 89, 146102, 2002.

[2002Jac] Kenneth A. Jackson, The interface kinetics of crystal growth processes, *Interface Sci.* 10, 159-169, 2002.

[2002Lib] K. G. Libbrecht and T. Crosby and M. Swanson, Electrically enhanced free dendrite growth in polar and non-polar systems, *J. Cryst. Growth* 240, 241-254, 2002. To my knowledge, this is the best description to date of electrical effects in diffusion-limited dendritic growth, focusing on the formation of "electric" ice needles.

[2002Liu] S. J. Liu and H. C. Huang and C. H. Woo, Schwoebel-ehrlich barrier: from two to three dimensions, *Appl. Phys. Lett.* 80, 3295-3297, 2002.

[2002Mat] M. Matsumoto, S. Saito and I. Ohmine, Molecular dynamics simulation of the ice nucleation and growth process leading to water freezing, *Nature* 416, 409-413, 2002.

[2002Mut] Boyan Mutaftschiev, *The Atomistic Nature of Crystal Growth*, Springer-Verlag: Berlin, 2002.

[2002Raa] E. Raabe, Cellular automata in materials science with particular reference to recrystallization simulation, *Ann. Rev. Mat. Sci.* 32, 53-76, 2002.

[2002Wan] Pao K. Wang, Shape and microdynamics of ice particles and their effects in cirrus clouds, *Adv. Geophys.* 45, 1-258, 2002.

[2002Wei] X. Wei and et al, Sum-frequency spectroscopic studies of ice interfaces, *Phys. Rev. B* 66, 085401, 2002.

[2003Abb] J. P. D. Abbatt, Interactions of atmospheric trace gases with ice surfaces: adsorption and reaction, *Chem. Rev.* 103, 4783-4800, 2003.

[2003Lib] K. G. Libbrecht, Growth rates of the principal facets of ice between -10C and -40C, *J. Cryst. Growth* 247, 530-535, 2003.

[2003Lib1] K. G. Libbrecht, Explaining the formation of thin ice-crystal plates with structure-dependent attachment kinetics, *J. Cryst. Growth* 258, 168-175, 2003.

[2003Lib2] Kenneth Libbrecht and Patricia Rasmussen, *The Snowflake: Winter's Secret Beauty*, Voyageur Press, 2003.

[2003Shi] A. A. Shibkov and et al., Morphology diagram of nonequilibrium patterns of ice crystals growing in supercooled water, *Physica A* 319, 65-79, 2003.

[2003Ueh] Takuya Uehara and Robert F. Sekerka, Phase field simulations of faceted growth for strong anisotropy of kinetic coefficient, *J. Cryst. Growth* 254, 251-261, 2003.

[2004Bai] M. Bailey and J. Hallett, Growth rates and habits of ice crystals between -20C and -70C, *J. Atmos. Sci.* 61, 514-544, 2004.

[2004Hon] S. Y. Hong and J. Dudhia and S. H. Chen, "A revised approach to ice microphysical processes for the bulk parameterization of clouds and precipitation, *Mon. Weath. Rev.* 132, 103-120, 2004.

[2004Ike] T. Ikeda-Fukazawa and K. Kawamura, Molecular-dynamics studies of ice Ih, *J. Chem. Phys.* 120, 1395-1401, 2004.

[2004Lib] K. G. Libbrecht, A critical look at ice crystal growth data, arXiv: cond-mat/0411662, 2004.

[2004Mar] Ivan V. Markov, *Crystal Growth for Beginners: Fundamentals of Nucleation, Crystal Growth, and Epitaxy*, World Scientific Publishing Company, 2004.

[2004Nad] H. Nada and J. P. van der Eerden and Y. Furukawa, A clear observation of crystal growth of ice from water in a molecular dynamics simulation with a six-site potential model of H₂O, *J. Cryst. Growth* 266, 297-302, 2004.

[2004Sad] Vlad Sadtchenko et al., The vaporization rate of ice at temperature near its melting point, *J. Chem. Phys.* 121, 11980-11992 (2004).

Demonstrate that ice vaporization follows an Arrhenius behavior from -40 C to 0 C

[2004Shi] A. A. Shibkov and et al., Effect of surface kinetics on the dendritic growth of ice in supercooled water, *Crystallography Rep.* 46, 496-502, 2004.

[2005Car] M. A. Carignano, P. B. Shepson, and I. Szleifer, Molecular dynamics simulations of ice growth from supercooled water, *Mol. Phys.* 103, 2957-2967, 2005.

[2005Joh] G. P. Johari, Water's size-dependent freezing to cubic ice, *J. Chem. Phys.* 122, 194504, 2005.

[2005Kan] H. Kang, Chemistry of ice surfaces: Elementary reaction steps on ice studied by reactive ion scattering, *Accts. Chem. Res.* 38, 893-900, 2005.

[2005Lib] K. G. Libbrecht, The physics of snow crystals, *Rep. Prog. Phys.* 68, 855-895, 2005.

[2005Mar] Minoru Maruyama, Roughening transition of prism faces of ice crystals grown from melt under pressure, *J. Cryst. Growth* 275, 598-605, 2005.

[2005Rei] C. A. Reiter, A local cellular model for snow crystal growth, *Chaos, Solitons, and Fractals* 23, 1111-1119, 2005.

[2005Shi] A. A. Shibkov and et al., Crossover from diffusion-limited to kinetics-limited growth of ice crystals, *J. Cryst. Growth* 285, 215-227, 2005.

[2005Tar] U. Tartaglino and et al, Melting and nonmelting of solid surfaces and nanosystems, *Phys. Rep.* 411, 291-321, 2005.

[2005Tar1] U. Tartaglino and T. Zykova-Timan and F. Ercolessi and et. al, Melting and nonmelting of solid surfaces and nanosystems, *Phys. Reports* 411, 291-321, 2005.

[2005Zha] H. Zhang and et al., Aligned two- and three-dimensional structures by directional freezing of polymers and nanoparticles, *Nature Mater.* 4, 787-793, 2005.

[2006Das] J. G. Dash and A. W. Rempel and J. S. Wettlaufer, The physics of premelted ice and its geophysical consequences, *Rev. Mod. Phys.* 78, 695-741, 2006.

[2006Fer] A. F. Ferreira et al., Simulation of the solidification of pure nickel via the phase-field method, *Mat. Res.* 9, 349-356, 2006.

[2006Gra] Janko Gravner and David Griffeath, Modeling snow crystal growth I: Rigorous results for Packard's digital snowflakes, *Expt. Math.* 15, 421-444, 2006.

[2006Gra1] Laszlo Granasy et al., Phase field theory of crystal nucleation and polycrystalline growth: A review, *J. Mater. Res.* 21, 309-319, 2006.

[2006Lib] K. G. Libbrecht, Precision measurements of ice crystal growth rates, *arXiv:cond-mat/0608694*, 2006.

[2006Lib1] Kenneth Libbrecht, *Ken Libbrecht's Field Guide to Snowflakes*, Voyageur Press: Stillwater, MN, 2006.

[2006Tap] Walter Tape and Jarmo Moilanen, *Atmospheric Halos and the Search for Angle α* , American Geophysical Union, 2006.

[2007Avr] I. Avramov, Kinetics of growth of nanowhiskers (nanowires and nanotubes), *Nanoscale Res. Lett.* 2, 235-239, 2007.

[2007Dev] S. Deville and E. Saiz and A. P. Tomsia, Ice-templated porous alumina structures, *Acta Mater.* 55, 1965-1974, 2007.

[2007Li] Yimin Li and Gabor A. Somorjai, Surface premelting of ice, *J. Phys. Chem.* 111, 9631-9637, 2007.

[2007Nin] Chen Ning and Clifford A. Reiter, A cellular model for three-dimensional snow crystallization, *Comp. and Graphics* 31, 668-677, 2007.

[2008Con] M. M. Conde and C. Vega and A. Patrykiewicz, The thickness of a liquid layer on the free surface of ice as obtained from computer simulation, *J. Chem. Phys.* 129, 014702, 2008.

[2008Gra] Janko Gravner and David Griffeath, Modeling snow crystal growth II: A mesoscopic lattice map with plausible dynamics, *Physica D* 237, 385-404, 2008.

[2008Lib] Kenneth G. Libbrecht, Physically derived rules for simulating faceted crystal growth using cellular automata, *arXiv:0807.2616*, 2008.

[2008Lib1] Kenneth G. Libbrecht, Helen C. Morrison, and Benjamin Faber, Measurements of snow crystal growth dynamics in a free-fall convection chamber, *arXiv:0811.2994*, 2008.

[2008Lib2] Kenneth G. Libbrecht, Observations of an Impurity-driven Hysteresis

Behavior in Ice Crystal Growth at Low Pressure, *arXiv:0809.4863*, 2008.

[2008Lib3] Kenneth G. Libbrecht, Crystal Growth in the Presence of Surface Melting and Impurities: An Explanation of Snow Crystal Growth Morphologies, *arXiv:0810.0689*, 2008. Crystal Growth in the Presence of Surface Melting and Impurities: An Explanation of Snow Crystal Growth Morphologies

[2008Sin] I. Singer-Loginova and H. M. Singer, The phase field technique for modeling multiphase materials, *Rep. Prog. Phys.* 71, 106501, 2008.

[2009Bai] Matthew Bailey and John Hallett, A comprehensive habit diagram for atmospheric ice crystals: confirmation from the laboratory, AIRS II, and other field studies, *J. Atmos. Sci.* 66, 2888-2899, 2009.

[2009Fra] F. C. Frank, Snow crystals, *Cont. Phys.* 50,153-172, 2009.

[2009Gra] Janko Gravner and David Griffeath, Modeling snow-crystal growth: A three-dimensional mesoscopic approach, *Phys. Rev. E* 79, 011601, 2009.

[2009Kne] T. N. Knepp, T. L. Renkens, and P. B. Shepson, Gas phase acetic acid and its qualitative effects on snow crystal morphology and the quasi-liquid layer, *Atmos. Chem. Phys.* 9, 7679-7690, 2009.

[2009Lib] K. G. Libbrecht and H. M. Arnold, Measurements of ice crystal growth rates in air at -5 C and -10 C, *arXiv:0912.2518*, 2009.

[2009Lib1] Kenneth G. Libbrecht, Identification of a novel 'fishbone' structure in the dendritic growth of columnar ice crystals, *arXiv:0912.2522*, 2009.

[2009Lib2] K. G. Libbrecht, A versatile thermoelectric temperature controller with 10

mK reproducibility and 100 mK absolute accuracy, *Rev. Sci. Instr.* 80, 126107, 2009.

[2009Mun] E. Munch and E. Saiz and A. P. Tomsia and S. Deville, Architectural control of freeze-cast ceramics through additives and templating, *J. Am. Ceramic Soc.* 92, 1534-1539, 2009.

[2009Nes] S. Neshyba et al., Molecular Dynamics Study of Ice-Vapor Interactions via the Quasi-Liquid Layer, *J. Phys. Chem.* 113, 4597-4604, 2009.

[2010Bar] J. W. Barrett, Harald Garcke, and Robert Nürnberg, On stable parametric finite element methods for the Stefan problem and the Mullins-Sekerak problem with applications to dendritic growth, *J. Comp. Phys.* 229, 6270-6299, 2010.

[2010Dad] Ruzica Dadic, Bonnie Light, and Stephen G. Warren, Migration of air bubbles in ice under a temperature gradient, with application to “Snowball Earth”, *J. Geophys. Res.* 115, D18125, 2010.

[2010Saz] G. Sazaki et al., Elementary steps at the surface of ice crystals visualized by advanced optical microscopy, *PNAS* 107, 19702-19707, 2010.

[2011Kik] Katsuhiko Kikuchi and Masahiro Kajikawa, *Picture Book of Natural Snow Crystals*, Hokkaido Shinbun News Paper Co. (Sapporo), 2011.

[2011Lib] K. G. Libbrecht and R. Bell, Chemical influences on ice crystal growth from vapor, arXiv:1101.0127, 2011.

[2011Lib1] K. G. Libbrecht, An improved apparatus for measuring the growth of ice crystals from water vapor between -40C and 0C, arXiv:1109.1511, 2011.

[2011Lib2] K. G. Libbrecht and M. E. Rickerby, Measurements of growth rates of

(0001) ice crystal surfaces, arXiv:1110.5828, 2011.

[2011Lib3] Kenneth Libbrecht, *The Secret Life of a Snowflake*, Voyageur Press: Stillwater, MN, 2011.

[2011Pan] Ding Pan, Li-Min Liu, Ben Slater. et al., Melting the ice: On the relation between melting temperature and size for nanoscale ice crystals, *ACS Nano* 5, 4562-4569, 2011.

[2011Par] P. Parent et al., HCl adsorption on ice at low temperature: a combined X-ray absorption, photoemission and infrared study, *Phys. Chem. Chem. Phys.* 13, 7111-7177, 2011.

[2011Roz] Dmitri Rozmanov and Peter G. Kusalik, Temperature dependence of crystal growth of hexagonal ice (Ih), *Phys. Chem. Chem. Phys.* 13, 15501-15511, 2011.

[2012Bai] Matthew Bailey and John Hallett, Ice crystal linear growth rates from -20 to -70C: Confirmation from Wave cloud studies, *J. Atmos. Sci.* 69, 390-402, 2012.

[2012Bar] John Barrett, Harald Garcke, and Robert Nürnberg, Numerical computations of faceted pattern formation in snow crystal growth, *Phys. Rev. E* 86, 011604, 2012.

[2012Fro] T. Frolov and M. Asta, Step free energies at faceted solid-liquid interfaces from equilibrium molecular dynamics simulations, *J. Chem. Phys.* 137, 214108, 2012.

[2012Kni] Charles A. Knight, Ice growth from the vapor at -5 C, *J. Atmos. Sci.* 69, 2031-2040, 2012.

[2012Lib] Kenneth G. Libbrecht, Managing systematic errors in ice crystal growth experiments, arXiv:1208.5064, 2012.

[2012Lib1] Kenneth G. Libbrecht, Toward a comprehensive model of snow crystal growth

dynamics: 1. Overarching Features and Physical Origins, arXiv:1211.5555, 2012.

[2012Lib2] K. G. Libbrecht, On the equilibrium shape of an ice crystal, arXiv:1205.1452, 2012.

[2012Lib3] K. G. Libbrecht, An edge-enhancing crystal growth instability caused by structure-dependent attachment kinetics, arXiv:1209.4932, 2012.

[2012Roz] Dmitri Rozmanov and Peter G. Kusalik, Anisotropy in the crystal growth of hexagonal ice I-h, *J. Chem. Phys.* 137, 094702, 2012.

[2012Seo] M. Seo, E. Jang, et al., Understanding anisotropic growth behavior of hexagonal ice on a molecular scale: A molecular dynamics simulation study, *J. Chem. Phys.* 137, 154503, 2012.

[2012Wan] S. Wang, M. A. Zaem, et al., Investigating thermal effects on morphological evolution during crystallization of hcp metals: three-dimensional phase field study, *Materials Tech.* 27, 355-363, 2012.

[2013Kel] James G. Kelly and Everett C. Boyer, Physical improvements to a mesoscopic cellular automaton model for three-dimensional snow crystal growth, arXiv:1308.4910, 2013.

[2013Kik] Katsuhiko Kikuchi, Takao Kameda, Keiji Higuchi, and Akira Yamashita, A global classification of snow crystals, ice crystals, and solid precipitation based on observations from middle latitudes to polar regions, *Atmospheric Research* 132-133, 460-472, 2013.

[2013Lib] Kenneth G. Libbrecht and Mark E. Rickerby, Measurements of surface attachment kinetics for faceted ice crystal growth, *J. Crystal Growth* 377, 1-8, 2013. Preprint at arXiv:1208.5982.

[2013Lib1] Kenneth G. Libbrecht, Quantitative modeling of faceted ice crystal growth from water vapor using cellular automata, *J. Computational Methods in Phys.*, ID-174806, 2013.

[2013Lib2] Kenneth G. Libbrecht, Toward a comprehensive model of snow crystal growth dynamics: 2. Structure dependent attachment kinetics near -5 C, arXiv:1302.1231, 2013.

[2013Sch] E. J. Schwalbach, J. A. Warren, K.-A. Wu, and P. W. Voorhees, Phase-field crystal model with a vapor phase, *Phys. Rev. E* 88, 023306, 2013.

[2014Asa] H. Asakawa, G. Sazaki, et al., Roles of surface/volume diffusion in the growth kinetics of elementary spiral steps on ice basal facets grown from water vapor, *Cryst. Growth and Design* 14, 3210-3220, 2014.
See also [2015Lib]

[2014Bar] J. W. Barrett, H. Garcke, R. Nürnberg, Stable phase field approximations of anisotropic solidification, *IMA J. Numerical Anal.* 34, 1289-1237, 2014.

[2014Bar1] John W. Barrett, Harald Garcke, and Robert Nürnberg, Phase field models versus parametric front tracking methods: Are the accurate and computationally efficient?, *Commun. Comput. Phys.* 15, 506-555, 2014.

[2014Kel] J. G. Kelly and E. C. Boyer, Physical improvements to a mesoscopic cellular automaton model for three-dimensional snow crystal growth, *Cryst. Growth & Design* 14, 1392-1405, 2014. Preprint at arXiv:1308.4910.

[2014Lib] Kenneth G. Libbrecht, Toward a comprehensive model of snow crystal growth dynamics: 3. The correspondence between ice growth from water vapor and ice growth from liquid water, arXiv:1407.0740, 2014.

[2014Lib1] Kenneth G. Libbrecht, A dual diffusion chamber for observing ice crystal growth on c-axis ice needles, arXiv:1405.1053, 2014.

[2014Lim] David T. Limmer and David Chandler, Premelting, fluctuations, and coarse-graining of water-ice interfaces, J. Chem. Phys. 141, 18C505 (2014).

[2014Tak] Tomohiro Takaki, Phase-field modeling and simulations of dendrite growth, ISIJ International 54, 437-444, 2014.

[2015Asa] Harutoshi Asakawa, Gen Sazaki, Ken Nagashima, Shunichi Nakatsubo, and Yoshinori Furukawa, Prism and Other High-Index Faces of Ice Crystals Exhibit Two Types of Quasi-Liquid Layers, Cryst. Growth Des. 15, 3339–3344, 2015.

[2015Ick] Luisa Ickes et al., Classical nucleation theory of homogeneous freezing of water: thermodynamic and kinetic properties, Phys. Chem. Chem. Phys. 17, 5514-5537, 2015.

[2015Lib] Kenneth G. Libbrecht, The surface diffusion length of water molecules on faceted ice: A reanalysis of 'Roles of surface/volume diffusion in the growth kinetics of elementary spiral steps on ice basal faces grown from water vapor' by Asakawa et al., arXiv:1509.06609, 2015.

[2015Lib1] Kenneth G. Libbrecht, Incorporating surface diffusion into a cellular automata model of ice growth from water vapor, arXiv:1509.08543, 2015.

[2015Lib2] Kenneth Libbrecht, Christopher Miller, Ryan Potter, et al., Toward a comprehensive model of snow crystal growth dynamics: 4. Measurements of diffusion-limited growth at -15 C, arXiv:1512.03389, 2015.

[2015Lib3] Kenneth G. Libbrecht, An experimental apparatus for observing

deterministic structure formation in plate-on-pedestal ice crystal growth, arXiv: 1503.01019, 2015.

[2015Lib4] Kenneth Libbrecht and Rachel Wing, *The Snowflake: Winter's Frozen Artistry*, Voyageur Press: Stillwater, MN, 2015.

[2015Ree] David W. Rees Jones and Andrew L. Wells, Solidification of a disk-shaped crystal from a weakly supercooled binary melt, Phys. Rev. E92, 022406, 2015.

[2016Ben] Jorge Benet et al., Premelting-induced smoothening of the ice-vapor interface, Phys. Rev. Lett. 117, 096101, 2016.

[2016Feg] John M. Fegyveresi et al., Five millennia of surface temperatures and ice core bubble characteristics from the WAIS Divide deep core, West Antarctica, Paleoceanography 31, 416-433, 2016.

[2016Har] Alexander Harrison et al., Levitation diffusion chamber measurements of the mass growth of small ice crystals from vapor, J. Atmos. Sci. 73, 2743-2758, 2016.

[2016Li] Jessica Li and Laura P. Schaposnik, Interface control and snow crystal growth, Phys. Rev. E93, 023302, 2016.

[2016Lib] Kenneth G. Libbrecht, Measurements of cylindrical ice crystal growth limited by combined particle and heat diffusion, arXiv:1602.02683, 2016.

[2016Lib1] Kenneth G. Libbrecht, Toward a comprehensive model of snow crystal growth dynamics: 5. Measurements of changes in attachment kinetics from background gas interactions at -5C, arXiv:1602.08528, 2016.

[2017Bru] Alexandra Brunberg et al., Single-crystal Ih ice surfaces unveil connection between macroscopic and molecular structure, PNAS 114, 5349-5354, 2017.

[2017Dem] G. Demange et al., Growth kinetics and morphology of snowflakes in supersaturated atmosphere using a three-dimensional phase-field model, *Phys. Rev. E* 96, 022803, 2017.

Generates morphologies that look like snowflakes, but uses physically unrealistic assumption of highly anisotropic surface energies.

[2017Dem1] Gilles Demange et al., A phase field model for snow crystal growth in three dimensions, *npj Computational Materials* 3, 15, 2017.

[2017Jaa] Mohamad Ali Jaafar et al., A review of dendritic growth during solidification: Mathematical modeling and numerical simulations, *Renewable and Sustainable Energy Rev.* 74, 1064-1079, 2017.

[2017Lib] Kenneth G. Libbrecht, Physical dynamics of ice crystal growth, *Ann. Rev. Mater. Res.* 47, 271-95, 2017.

Provided as an appendix to this book.

A comprehensive review of snow-crystal growth as well as ice growth from liquid water. (Note Equation 5 in this paper contains a typo; the correct equation is presented in Chapter 4.)

[2017Lup] Laura Lupi et al., Role of stacking disorder in ice nucleation, *Nature* 551, 218 2017.

Describes how 3D nucleation of ice is dominated by stacking-disordered structures, increasing nucleation rates relative to expectations from standard nucleation theory.

[2018Moh] Ali Mohandesi and Peter G. Kusalik, Probing ice growth from vapor phase: A molecular dynamics simulation approach, *J. Cryst. Growth* 483, 156-163, 2018.